

=> FILE REG

FILE 'REGISTRY' ENTERED AT 10:52:32 ON 05 JUN 2003  
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STRUCTURE FILE UPDATES: 4 JUN 2003 HIGHEST RN 525536-93-0  
DICTIONARY FILE UPDATES: 4 JUN 2003 HIGHEST RN 525536-93-0

TSCA INFORMATION NOW CURRENT THROUGH JANUARY 6, 2003

Please note that search-term pricing does apply when  
conducting SmartSELECT searches.

Crossover limits have been increased. See HELP CROSSOVER for details.

Experimental and calculated property data are now available. See HELP  
PROPERTIES for more information. See STN Note 27, Searching Properties  
in the CAS Registry File, for complete details:  
<http://www.cas.org/ONLINE/STN/STNOTES/stnotes27.pdf>

=> FILE HCAPLUS

FILE 'HCAPLUS' ENTERED AT 10:52:37 ON 05 JUN 2003  
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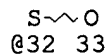
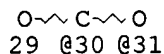
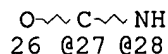
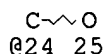
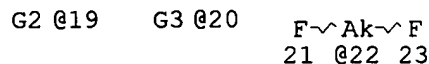
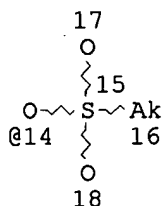
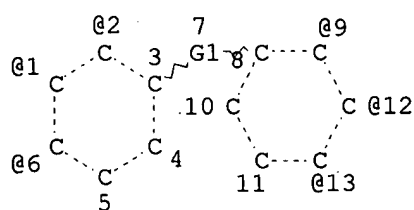
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FILE COVERS 1907 - 5 Jun 2003 VOL 138 ISS 23  
FILE LAST UPDATED: 4 Jun 2003 (20030604/ED)

This file contains CAS Registry Numbers for easy and accurate  
substance identification.

=> D QUE

L3 STR



*2,186 polymers  
found with this monomer.  
query covers all possibilities  
for monomer A*

VAR G1=24/22/27-3 28-8/30-3 31-8/32  
VAR G2=BR/CL/I/14  
VAR G3=I/BR/CL/14  
VPA 19-9/12/13 U  
VPA 20-1/2/6 U  
NODE ATTRIBUTES:  
CONNECT IS E1 RC AT 25  
DEFAULT MLEVEL IS ATOM  
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:  
RING(S) ARE ISOLATED OR EMBEDDED  
NUMBER OF NODES IS 33

STEREO ATTRIBUTES: NONE  
L6 SCR 2043  
L8 2186 SEA FILE=REGISTRY SSS FUL L3 AND L6  
L9 2516 SEA FILE=HCAPLUS ABB=ON L8  
L10 4 SEA FILE=HCAPLUS ABB=ON L9(L) ELECTROLYTE?(L) MEMBRANE?  
L11 29 SEA FILE=HCAPLUS ABB=ON L9 AND ELECTROLYTE?(L) MEMBRANE?  
L12 1400 SEA FILE=HCAPLUS ABB=ON L9(L) (PREP OR IMF OR SPN)/RL  
L13 18 SEA FILE=HCAPLUS ABB=ON L11 AND L12  
L14 27 SEA FILE=HCAPLUS ABB=ON L12 AND FUEL(2A) CELL#  
L15 25 SEA FILE=HCAPLUS ABB=ON L14 AND (ELECTROLYTE? OR MEMBRANE?)  
L16 30 SEA FILE=HCAPLUS ABB=ON L10 OR L13 OR L15

=> D L16 1-30 ALL HITSTR

L16 ANSWER 1 OF 30 HCAPLUS COPYRIGHT 2003 ACS  
AN 2003:319959 HCAPLUS  
DN 138:339060  
TI Crosslinkable aromatic resins having protonic acid groups, and ion  
conductive polymer **membranes**, binders, and **fuel**  
**cells** made by using the same  
IN Ishikawa, Junichi; Kuroki, Takashi; Fujiyama, Satoko; Omi, Takehiko;  
Nakata, Tomoyuki; Okawa, Yuichi; Miyazaki, Kazuhisa; Fujii, Shigeharu;  
Tamai, Shoji  
PA Mitsui Chemicals, inc., Japan  
SO PCT Int. Appl., 132 pp.  
CODEN: PIXXD2  
DT Patent  
LA Japanese

IC ICM C08G065-40  
 ICS C08G069-48; C08G073-10; C08J005-22; H01M008-02  
 CC 37-3 (Plastics Manufacture and Processing)  
 Section cross-reference(s): 38, 52

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003033566	A1	20030424	WO 2002-JP10536	20021010
	W: CA, CN, IN, JP, KR, US RW: DE, FR, GB, IT, SE				
PRAI	JP 2001-312799	A	20011010		
	JP 2002-182252	A	20020621		
AB	<p>The invention relates to (A) a crosslinkable arom. resin which has crosslinking groups and protonic acid groups and is suitable for <b>electrolyte membranes</b> and binders for <b>fuel cells</b>, (B) polymeric <b>electrolyte membranes</b> and binders for <b>fuel cells</b>, made by using the resin, and (C) <b>fuel cells</b> made by using the <b>membranes</b> or the binders. The arom. resin has crosslinking groups which are not derived from protonic acid groups and are capable of causing crosslinking without the formation of a leaving component, and exhibits excellent ionic cond., heat resistance, water resistance, and adhesion, and low methanol permeability. It is preferable that the arom. resin bears as the crosslinking groups both C1-10 alkyl bonded directly to an arom. ring and carbonyl or carbon-carbon double or triple bonds, while preferred examples of the crosslinkable arom. resin include arom. polyether, arom. polyamide, arom. polyimide, arom. polyamide-imide, and arom. polyazole, each of which has crosslinking groups described above. Thus, 5,5'-carbonylbis(sodium 2-fluorobenzenesulfonate) obtained from 0.525 mol 4,4'-difluorobenzophenone and 210 mL 50% sulfuric acid 4.22, 4,4'-difluorobenzophenone 2.18, and 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)propane 5.69 g were reacted at 160.degree. for 4 h in the presence of potassium carbonate to give 10.39 g polyether ketone powder with reduced viscosity 0.85 dL/g, glass transition temp. 230.degree., and 5% wt. loss temp. 367.degree., which was applied on a glass and dried at 200.degree. for 4 h to give a <b>membrane</b> with cond. 0.018 S/cm at 30.degree. and 0.065 S/cm at 90.degree..</p>				
ST	<p>crosslinkable arom resin protonic acid group ion conductive <b>membrane</b>; carbonylbissodiumfluorobenzenesulfonate difluorobenzophenone bisdimethylhydroxyphenylpropane copolymer <b>membrane</b> prepn</p>				
IT	<p>Polyamides, uses          Polyimides, uses          RL: TEM (Technical or engineered material use); USES (Uses)          (arom., protonic acid-contg.; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer <b>membranes</b>, binders, and <b>fuel cells</b>)</p>				
IT	<p>Polyimides, preparation          RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)          (blend with protonic acid group-contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer <b>membranes</b>, binders, and <b>fuel cells</b>)</p>				
IT	<p>Binders          (ion conductive; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer <b>membranes</b>, binders, and <b>fuel cells</b>)</p>				

- IT **Membranes, nonbiological**  
(ionic conductive; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyimides, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(polyamide-, arom., protonic acid-contg.; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyimides, preparation  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyamide-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyketones  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyamide-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyketones  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyamide-polyimide-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyimides, preparation  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyamide-polyketone-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyethers, preparation  
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polybenzoxazole-, blend with protonic acid group-contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyketones  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polybenzoxazole-, sodium sulfonated, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polybenzoxazoles  
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyether-, blend with protonic acid group-contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polysulfones, preparation  
Polysulfones, preparation

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polyketones

RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-, optionally crosslinked, and blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polysulfides

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-, polyketones-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polysulfones, preparation

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polysulfones, preparation

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-polyketone-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polyketones

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-polysulfone-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polyamides, uses

RL: TEM (Technical or engineered material use); USES (Uses)  
 (polyimide-, arom., protonic acid-contg.; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polyamides, preparation

Polyketones

Polysulfones, preparation

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyimide-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT Polysulfones, preparation

RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyimide-polyketone-, blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

- IT Polyamides, preparation  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyimide-polyketone-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyketones  
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyimide-polysulfone-, blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyimides, preparation  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyethers, preparation  
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-, optionally crosslinked, and blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polybenzoxazoles  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-, sodium sulfonated, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyamides, preparation  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyimides, preparation  
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-polysulfone-, blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyethers, preparation  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-polysulfone-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyethers, preparation  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polysulfide-, polyketones-; prepn. of crosslinkable arom. resins

- having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyethers, preparation  
Polyethers, preparation  
Polyimides, preparation  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polysulfone-, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyethers, preparation  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polysulfone-; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT **Fuel cells**  
Ionic conductors  
Polymer **electrolytes**  
(prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polymer blends  
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
(prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Electrodes  
(prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, electrodes, and **fuel cells**)
- IT Polyoxyarylenes  
RL: TEM (Technical or engineered material use); USES (Uses)  
(protonic acid-contg.; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polyoxyphenylenes  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(sodium sulfonated; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT Polybenzoxazoles  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(sulfonated; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT 25134-01-4DP, Poly(2,6-dimethyl-1,4-phenylene oxide), sodium sulfonated  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(assumed monomers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT 31694-16-3DP, PEEK 450P, sodium sulfonated  
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP

- (Preparation); USES (Uses)  
(blend with polyether-polyketone or polybenzoxazole, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT 515144-49-7P 515144-50-0P 515144-51-1P 515144-53-3P  
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(blend with polyimide; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT 29658-28-4P 32034-67-6P  
RL: IMF (Industrial manufacture); PREP (Preparation)  
(blend with protonic acid group contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT 87781-17-7P 87792-34-5P  
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(blend with protonic acid group contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT 25897-65-8P, Bisphenol A-4,4'-difluorobenzophenone copolymer 28825-50-5P, 3,3',4,4'-Benzophenonetetracarboxylic dianhydride-3,3'-Diaminodiphenylsulfone copolymer 41205-96-3P 54571-77-6P 127583-87-3P 127669-56-1P 515144-54-4P 515144-55-5P  
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(blend with protonic acid group-contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT 515144-56-6P 515144-57-7P  
RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(blend with protonic acid group-contg. polymers; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)
- IT 108-31-6DP, Maleic anhydride, reaction products with protonic acid group-contg. polymers 405-99-2DP, 4-Fluorostyrene, reaction products with sulfonated polymers 620-18-8DP, 3-Vinylphenol, reaction products with sulfonated polymers 1076-99-9DP, 4-Allylbenzoic acid, reaction products with protonic acid group-contg. polymers 1120-71-4DP, Propanesultone, reaction products with arom. polyether-polyketones 1745-89-7DP, reaction products with sulfonated polymers 20161-52-8DP, reaction products with sulfonated polymers 102501-86-0DP, 2-Allylphenol-2,6-dimethylphenol copolymer, sodium sulfonated **146673-88-3DP**, reaction products with ethylenically unsatd. compds. 163395-54-8DP, reaction products with protonic acid group-contg. polymers 210531-46-7DP, reaction products with ethenylphenol 342047-78-3DP, reaction products with ethenylphenol 342047-79-4DP, reaction products with ethenylphenol **515144-35-1P** 515144-36-2P 515144-37-3P 515144-38-4P 515144-39-5P 515144-40-8P 515144-41-9P 515144-42-0P 515144-44-2DP, sulfonated 515144-45-3DP, sulfonated

515144-47-5P 515144-48-6P 515144-51-1DP, reaction products with ethenylbenzoyl chloride. 515144-53-3DP, reaction products with ethenylbenzoyl chloride 515144-58-8P 515144-59-9P  
**515144-66-8DP**, reaction products with ethenylphenol  
**515144-67-9DP**, reaction products with ethenylphenol  
**515144-68-0DP**, reaction products with ethenylphenol  
**515144-69-1DP**, reaction products with ethenylphenol  
**515144-70-4DP**, reaction products with ethylenically unsatd. compds. 515144-71-5DP, reaction products with monoanhydride compds. 515144-72-6DP, reaction products with maleic anhydride 515144-73-7DP, reaction products with allylbenzoic acid, sulfonated 515144-74-8DP, reaction products with allylbenzoic acid, sulfonated 515144-75-9DP, reaction products with ethylenically unsatd. compds.

RL: **IMF (Industrial manufacture)**; PRP (Properties); TEM (Technical or engineered material use); **PREP (Preparation)**; **USES (Uses)**

(crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT 51698-33-0P 210531-45-6P 515144-46-4P

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)

(monomer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT 515144-24-8P **515144-34-0P**

RL: **IMF (Industrial manufacture)**; PRP (Properties); TEM (Technical or engineered material use); **PREP (Preparation)**; **USES (Uses)**

(optionally crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT 515144-43-1DP, sulfonated

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); **USES (Uses)**

(polybenzoxazole, crosslinked; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT 24938-67-8DP, Poly(2,6-dimethyl-1,4-phenylene oxide), sodium sulfonated **267877-35-0DP**, reaction products with ethenylphenol 515144-25-9P  
 515144-26-0P 515144-27-1P 515144-28-2P 515144-29-3P 515144-30-6P  
 515144-31-7P **515144-32-8P 515144-33-9P**

**515144-60-2P** 515144-61-3P 515144-62-4P 515144-64-6DP, sulfonated 515144-65-7DP, sulfonated 515811-98-0P

RL: **IMF (Industrial manufacture)**; PRP (Properties); TEM (Technical or engineered material use); **PREP (Preparation)**; **USES (Uses)**

(prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

IT 80-05-7, 2,2-Bis(4-hydroxyphenyl)propane, reactions 80-07-9, 4,4'-Dichlorodiphenylsulfone 345-92-6, 4,4'-Difluorobenzophenone

RL: RCT (Reactant); RACT (Reactant or reagent)

(reactant in monomer prepn.; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer **membranes**, binders, and **fuel cells**)

RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD  
 RE

- (1) Commissariat A L'Energie Atomique; WO 0125312 A 2001 HCAPLUS
- (2) Commissariat A L'Energie Atomique; JP 2000510511 A 2001
- (3) Commissariat A L'Energie Atomique; US 200120082 A 2001
- (4) Commissariat A L'Energie Atomique; FR 2799198 A 2001 HCAPLUS
- (5) Hoechst Ag; JP 11-502245 A 1999
- (6) Hoechst Ag; WO 9629359 A 1999 HCAPLUS
- (7) Kaneka Corp; JP 2002105199 A 2002 HCAPLUS
- (8) Kaneka Corp; JP 2002121281 A 2002 HCAPLUS
- (9) Sumitomo Electric Industries Ltd; JP 2002358978 A 2002 HCAPLUS
- (10) Sumitomo Electric Industries Ltd; JP 2002367627 A 2002 HCAPLUS
- (11) Victrex Manufacturing Ltd; WO 0015691 A 2000 HCAPLUS
- (12) Victrex Manufacturing Ltd; JP 2002524631 A 2000

IT 29658-28-4P

RL: IMF (Industrial manufacture); PREP (Preparation)

(blend with protonic acid group contg. polymer; prepn. of crosslinkable arom. resins having protonic acid groups for ion conductive polymer membranes, binders, and fuel cells)

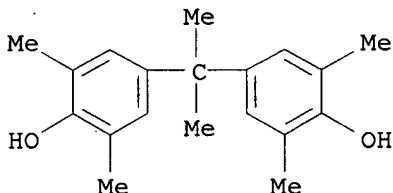
RN 29658-28-4 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis[2,6-dimethyl-, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 5613-46-7

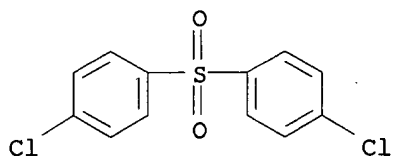
CMF C19 H24 O2



CM 2

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



IT 146673-88-3DP, reaction products with ethylenically unsatd. compds. 515144-35-1P 515144-66-8DP, reaction products with ethenylphenol 515144-67-9DP, reaction products with ethenylphenol 515144-68-0DP, reaction products with ethenylphenol 515144-69-1DP, reaction products with ethenylphenol 515144-70-4DP, reaction products with ethylenically unsatd. compds.

RL: **IMF (Industrial manufacture)**; PRP (Properties); TEM  
(Technical or engineered material use); **PREP (Preparation)**; USES  
(Uses)

(crosslinked; prepn. of crosslinkable arom. resins having protonic acid  
groups for ion conductive polymer **membranes**, binders, and  
**fuel cells**)

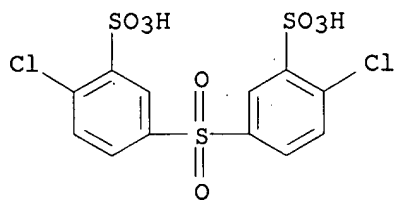
RN 146673-88-3 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer  
with 4,4'-(1-methylethylidene)bis[phenol] and 1,1'-sulfonylbis[4-  
chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

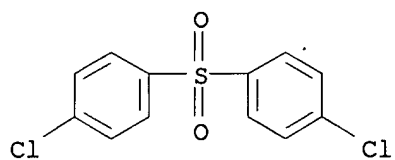


● 2 Na

CM 2

CRN 80-07-9

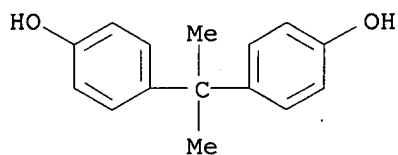
CMF C12 H8 Cl2 O2 S



CM 3

CRN 80-05-7

CMF C15 H16 O2



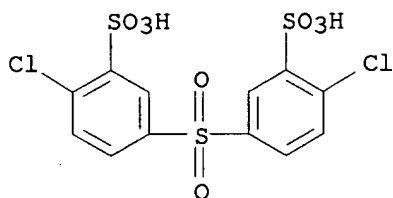
RN 515144-35-1 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with bis(4-chlorophenyl)methanone and 4,4'-methylenebis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

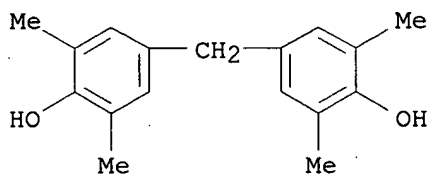


● 2 Na

CM 2

CRN 5384-21-4

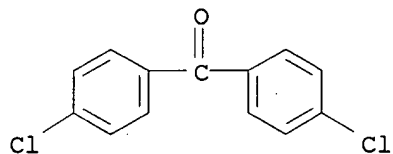
CMF C17 H20 O2



CM 3

CRN 90-98-2

CMF C13 H8 Cl2 O



RN 515144-66-8 HCAPLUS

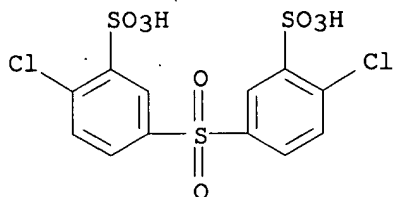
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI)

(CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 C12 O8 S3 . 2 Na

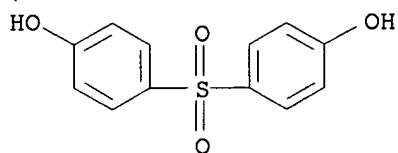


● 2 Na

CM 2

CRN 80-09-1

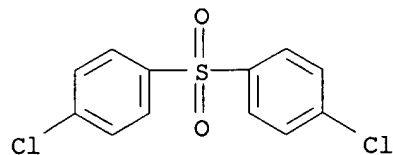
CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 C12 O2 S



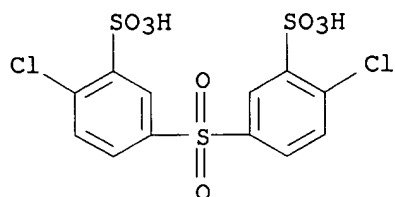
RN 515144-67-9 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with 1,4-benzenediol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

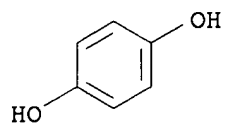


● 2 Na

CM 2

CRN 123-31-9

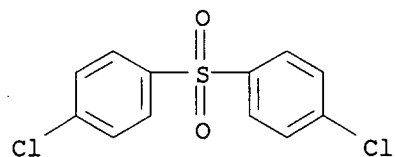
CMF C6 H6 O2



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



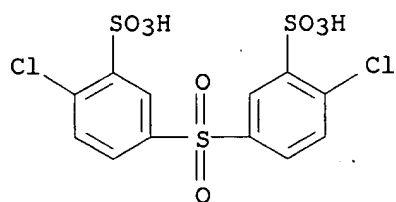
RN 515144-68-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with methylenebis[phenol] and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na



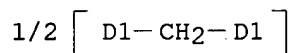
● 2 Na

CM 2

CRN 1333-16-0  
CMF C13 H12 O2  
CCI IDS

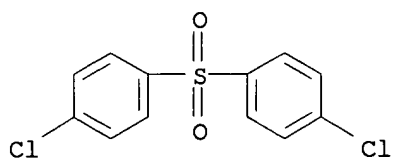


D1-OH



CM 3

CRN 80-07-9  
CMF C12 H8 Cl2 O2 S

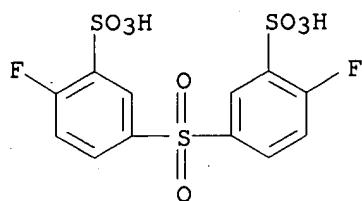


RN 515144-69-1 HCAPLUS  
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-fluoro-, disodium salt, polymer with 4,4'-(1-methylethylidene)bis[phenol] and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 301155-59-9

CMF C12 H8 F2 O8 S3 . 2 Na

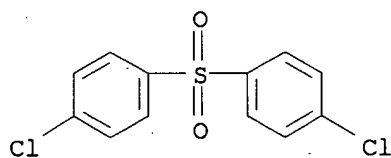


● 2 · Na

CM 2

CRN 80-07-9

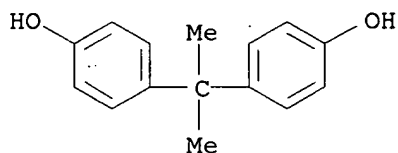
CMF C12 H8 C12 O2 S



CM 3

CRN 80-05-7

CMF C15 H16 O2



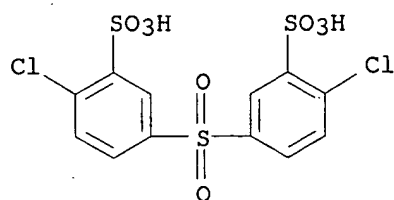
RN 515144-70-4 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with 4,4'-(1-methylethylidene)bis[phenol] and 1,1'-sulfonylbis[4-fluorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 C12 O8 S3 . 2 Na

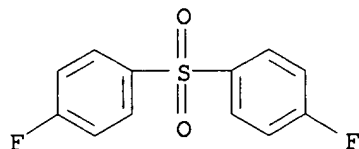


● 2 Na

CM 2

CRN 383-29-9

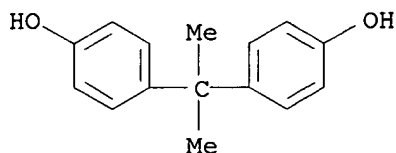
CMF C12 H8 F2 O2 S



CM 3

CRN 80-05-7

CMF C15 H16 O2



IT 515144-34-0P

RL: IMF (Industrial manufacture); PRP (Properties); TEM  
(Technical or engineered material use); PREP (Preparation); USES  
(Uses)

(optionally crosslinked; prepn. of crosslinkable arom. resins having  
protonic acid groups for ion conductive polymer membranes,  
binders, and fuel cells)

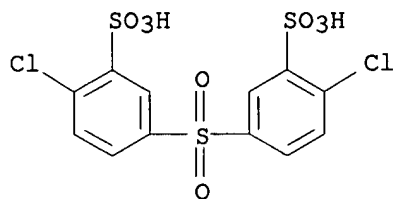
RN 515144-34-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer  
with bis(4-fluorophenyl)methanone and 4,4'-(1-methylethylidene)bis[2,6-  
dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

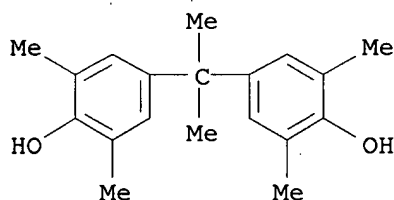
CMF C12 H8 Cl2 O8 S3 . 2 Na



●2 Na

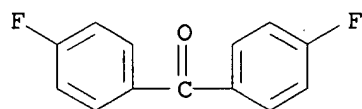
CM 2

CRN 5613-46-7  
CMF C19 H24 O2



CM 3

CRN 345-92-6  
CMF C13 H8 F2 O



IT 267877-35-ODP, reaction products with ethenylphenol

515144-32-8P 515144-33-9P 515144-60-2P

RL: IMF (Industrial manufacture); PRP (Properties); TEM  
(Technical or engineered material use); PREP (Preparation); USES  
(Uses)

(prepn. of crosslinkable arom. resins having protonic acid groups for  
ion conductive polymer membranes, binders, and fuel  
cells)

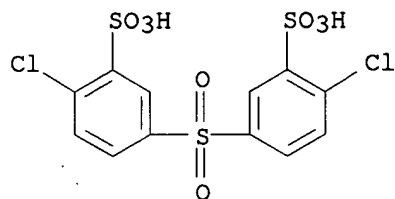
RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer  
with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)  
(CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

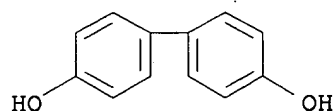


● 2 Na

CM 2

CRN 92-88-6

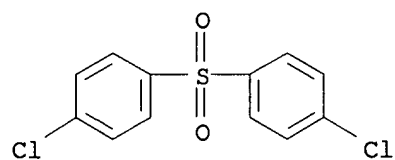
CMF C12 H10 O2



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



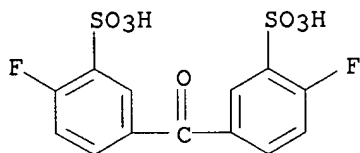
RN 515144-32-8 HCAPLUS

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, disodium salt, polymer with bis(4-chlorophenyl)methanone and 4,4'-(1-methylethylidene)bis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 210531-45-6

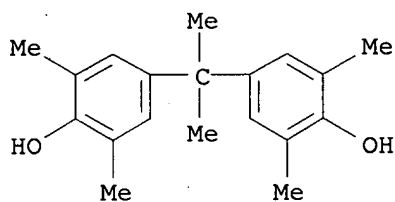
CMF C13 H8 F2 O7 S2 . 2 Na



● 2 Na

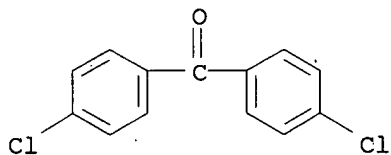
CM 2

CRN 5613-46-7  
CMF C19 H24 O2



CM 3

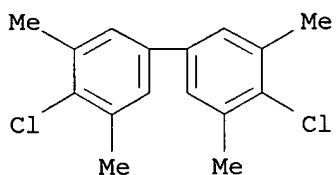
CRN 90-98-2  
CMF C13 H8 Cl2 O



RN 515144-33-9 HCAPLUS  
CN Benzenesulfonic acid, 3,3'-carbonylbis[6-chloro-, disodium salt, polymer with bis(4-chlorophenyl)methanone and 4,4'-dichloro-3,3',5,5'-tetramethyl-1,1'-biphenyl (9CI) (CA INDEX NAME)

CM 1

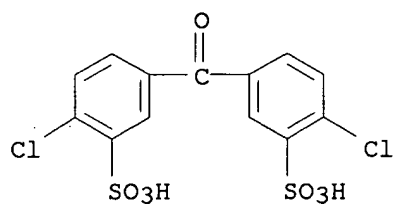
CRN 89448-05-5  
CMF C16 H16 Cl2



CM 2

CRN 57004-46-3

CMF C13 H8 Cl2 O7 S2 . 2 Na

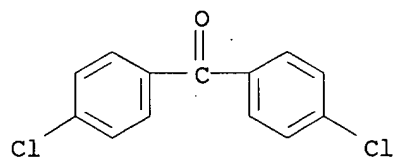


● 2 Na

CM 3

CRN 90-98-2

CMF C13 H8 Cl2 O



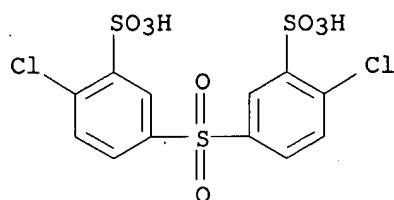
RN 515144-60-2 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with 4,4'-(1-methylethylidene)bis[2,6-dimethylphenol] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

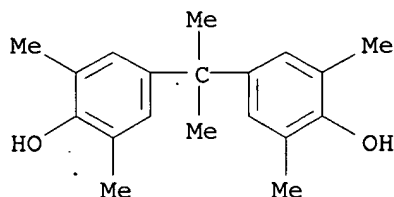
CMF C12 H8 Cl2 O8 S3 . 2 Na



● 2 Na

CM 2

CRN 5613-46-7  
CMF C19 H24 O2



L16 ANSWER 2 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2003:299029 HCAPLUS

DN 138:305286

TI Manufacture of branched polyarylene polymers with high toughness, their sulfonated products, and proton-conducting membranes

IN Takahashi, Masayuki; Yamakawa, Yoshitaka; Futami, Satoshi; Goto, Kohei

PA JSR Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 21 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C08G061-12

ICS C08J005-18; H01B001-06; H01M008-02; H01M006-18; H01M010-40;  
C08L065-00

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 52

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003113226	A2	20030418	JP 2001-307430	20011003
PRAI	JP 2001-307430		20011003		

AB The branched polyarylene polymers are manufd. by copolymn. of (A) monomers contg. XC6R4AC6R4X (X = Cl, Br, I; A = electron-withdrawing group; R = H, F, alkyl, fluoroalkyl), XC6R4AC6R4OC6R4AC6R4X, and/or X(C6R4AC6R4B)nC6R4AC6R4X (B = electron-donating group, divalent group; n .gtoreq.2) and (B) monomers contg. X2C6R3A(C6R4B)mZ (Z = aryl; m = 0, 1, 2), X-p-C6R4X, X-p-C6R4-p-C6R4X, and/or 1,3-X-disubstituted C6R4 in the

presence of (C) branching agents contg. C6R'5AC6R'5 (R' = H, Cl, Br, I, F, alkyl, fluoroalkyl, .gtoreq.3 of R' = Cl, Br, I), C6R'5AC6R'4OC6R'4AC6R'5, R' (C6R'4AC6R'4B)nC6R'4AC6R'5, C6R'6, and/or C6R'5C6R'5. The proton-conducting **membranes**, useful for battery **electrolytes**, etc., are prepd. by sulfonation of the branched polyarylene polymers with sulfonating agents. Thus, polymn. of 2,5-dichloro-4-phenoxybenzophenone 178, 2,4,4'-trichlorobenzophenone 2.0, 4,4'-dichlorobenzophenone 16, and 4-chlorobenzophenone 4.0 mmol gave a copolymer with Mw 146,000, which was sulfonated, dissolved in 1:1 vol NMP and methanol, cast, and dried to give a film with no tackiness and good surface smoothness.

- ST branch polyarylene polyether polyketone proton conducting membrane; chlorophenoxybenzophenone chlorobenzophenone polymer sulfonation battery electrode
- IT Battery **electrolytes**  
(manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting **membranes**)
- IT Polyketones  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyether-, fluorine-contg.; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)
- IT Polyketones  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyether-; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)
- IT Fluoropolymers, uses  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyether-polyketone-; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)
- IT Polyethers, uses  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyketone-, fluorine-contg.; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)
- IT Polyethers, uses  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyketone-; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)
- IT Ionic conductors  
(protonic; manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)
- IT 69266-28-0P **122325-09-1P**, 4,4'-Dichlorobenzophenone-hexafluorobisphenol A copolymer  
RL: **IMF (Industrial manufacture)**; RCT (Reactant); **PREP (Preparation)**; RACT (Reactant or reagent)  
(manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)
- IT 134-85-0DP, 4-Chlorobenzophenone, reaction products with polyarylene-polyether-polyketones, sulfonated **509075-82-5DP**, reaction products with chlorobenzophenone, sulfonated **509075-83-6DP**, reaction products with chlorobenzophenone, sulfonated **509075-84-7DP**, reaction products with chlorobenzophenone, sulfonated

RL: **IMF (Industrial manufacture)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
(manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

IT 122325-09-1P, 4,4'-Dichlorobenzophenone-hexafluorobisphenol A copolymer

RL: **IMF (Industrial manufacture)**; RCT (Reactant); **PREP (Preparation)**; RACT (Reactant or reagent)  
(manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

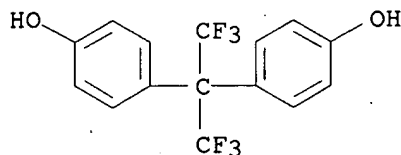
RN 122325-09-1 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 1478-61-1

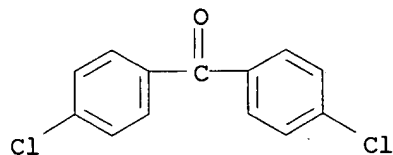
CMF C15 H10 F6 O2



CM 2

CRN 90-98-2

CMF C13 H8 Cl2 O



IT 509075-82-5DP, reaction products with chlorobenzophenone, sulfonated 509075-83-6DP, reaction products with chlorobenzophenone, sulfonated 509075-84-7DP, reaction products with chlorobenzophenone, sulfonated

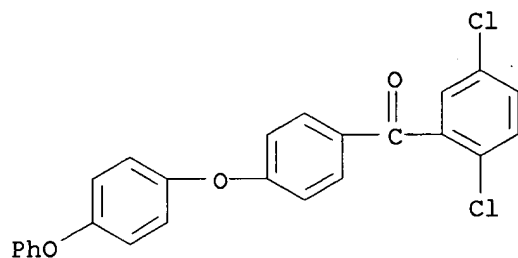
RL: **IMF (Industrial manufacture)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
(manuf. of sulfonated branched polyarylene polymers with high toughness for proton-conducting membranes)

RN 509075-82-5 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (4-chlorophenyl)(2,4-dichlorophenyl)methanone, (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

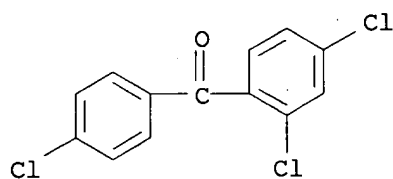
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CRN 463954-50-9  
CMF C25 H16 Cl2 O3



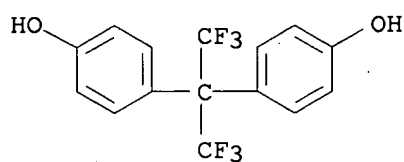
CM 2

CRN 33146-57-5  
CMF C13 H7 Cl3 O



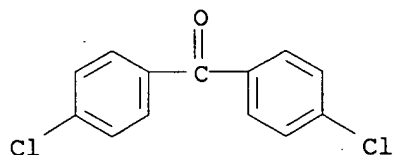
CM 3

CRN 1478-61-1  
CMF C15 H10 F6 O2



CM 4

CRN 90-98-2  
CMF C13 H8 Cl2 O



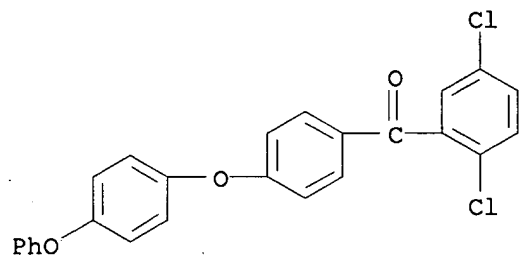
RN 509075-83-6 HCAPLUS

CN Methanone, [[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis(4,1-phenyleneoxy-4,1-phenylene)]bis[(4-chlorophenyl)-, polymer with (4-chlorophenyl) (2,4-dichlorophenyl)methanone and (2,5-dichlorophenyl) [4-(4-phenoxyphenoxy)phenyl]methanone (9CI) (CA INDEX NAME)

CM 1

CRN 463954-50-9

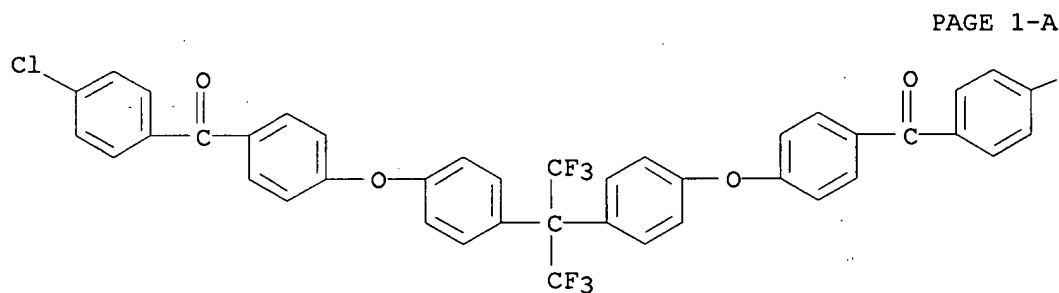
CMF C25 H16 Cl2 O3



CM 2

CRN 389634-34-8

CMF C41 H24 Cl2 F6 O4



PAGE 1-A

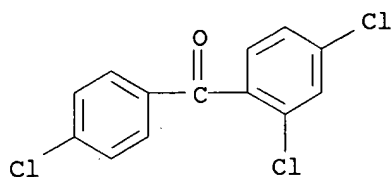
PAGE 1-B



CM 3

CRN 33146-57-5

CMF C13 H7 Cl3 O



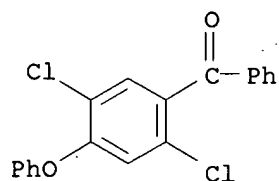
RN 509075-84-7 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (4-chlorophenyl)(2,4-dichlorophenyl)methanone and (2,5-dichloro-4-phenoxyphenyl)phenylmethanone (9CI) (CA INDEX NAME)

CM 1

CRN 444889-36-5

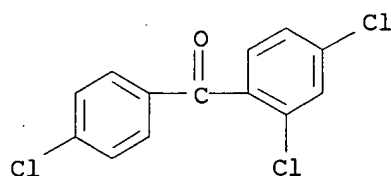
CMF C19 H12 Cl2 O2



CM 2

CRN 33146-57-5

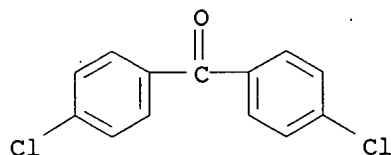
CMF C13 H7 Cl3 O



CM 3

CRN 90-98-2

CMF C13 H8 Cl2 O



L16 ANSWER 3 OF 30 HCAPLUS COPYRIGHT 2003 ACS  
 AN 2003:216958 HCAPLUS  
 DN 138:239119  
 TI Crosslinked polymer **electrolytes** with high proton conductivity and durability and their manufacture  
 IN Okaniwa, Motoki; Goto, Kohei  
 PA JSR Ltd., Japan  
 SO Jpn. Kokai Tokkyo Koho, 19 pp.  
 CODEN: JKXXAF  
 DT Patent  
 LA Japanese  
 IC ICM C08F002-44  
 ICS C08F283-00; H01B001-06; H01B013-00; H01M008-02; H01M008-10  
 CC 38-3 (Plastics Fabrication and Uses)  
 Section cross-reference(s): 52, 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003082012	A2	20030319	JP 2001-275421	20010911
PRAI	JP 2001-275421		20010911		

AB The polymer **electrolytes** for fuel cell proton-conductive **membranes**, battery **electrolytes**, displays, sensors, capacitors, ion-exchange **membranes**, etc., are manufd. by polymg. monomers having .gtoreq.2 radical-polymerizable groups in the presence of proton-conductive polymers and have insoly. to N-methylpyrrolidone .gtoreq.40%. Thus, bisphenol AF-4,4'-dichlorobenzophenone oligomer was reacted with 2,5-dichloro-4'-(4-phenoxy)phenoxybenzophenone to give a copolymer, which was reacted with H2SO4. A mixt. contg. the sulfonated polymer and Kayarad DPHA (dipentaerythritol hexaacrylate-dipentaerythritol pentaacrylate mixt.) was processed to give a crosslinked polymer film showing high proton cond. and tensile strength.

ST sulfonated polymer crosslinking **electrolyte** proton cond; dipentaerythritol hexaacrylate pentaerythritol pentaacrylate crosslinker polymer **electrolyte**

IT Conducting polymers  
**Electrolytes**  
 (crosslinked polymer **electrolytes** with high proton cond. and durability and their manuf.)

IT 77641-99-7, Kayarad DPHA.  
 RL: RCT (Reactant); TEM (Technical or engineered material use); RACT (Reactant or reagent); USES (Uses)  
 (crosslinking agent; crosslinked polymer **electrolytes** with high proton cond. and durability and their manuf.)

IT **364062-39-5DP**, 4,4'-Dichlorobenzophenone-2,5-dichloro-4'-phenoxybenzophenone copolymer, sulfonated **463963-71-5DP**, Bisphenol AF-4,4'-dichlorobenzophenone-2,5-dichloro-4'-(4-phenoxy)phenoxybenzophenone copolymer, sulfonated

RL: **IMF (Industrial manufacture)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)

(dipentaerythritol hexaacrylate- and dipentaerythritol pentaacrylate-crosslinked; crosslinked polymer **electrolytes** with high proton cond. and durability and their manuf.)

IT **364062-39-5DP**, 4,4'-Dichlorobenzophenone-2,5-dichloro-4'-phenoxybenzophenone copolymer, sulfonated **463963-71-5DP**, Bisphenol AF-4,4'-dichlorobenzophenone-2,5-dichloro-4'-(4-phenoxy)phenoxybenzophenone copolymer, sulfonated

RL: **IMF (Industrial manufacture)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)

(dipentaerythritol hexaacrylate- and dipentaerythritol pentaacrylate-crosslinked; crosslinked polymer **electrolytes** with high proton cond. and durability and their manuf.)

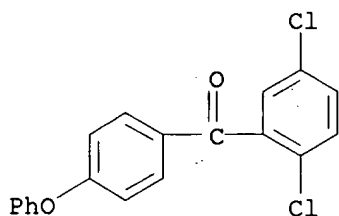
RN 364062-39-5 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)(4-phenoxyphenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 151173-25-0

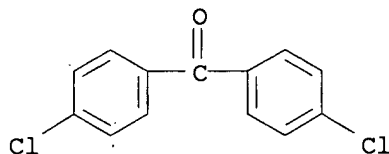
CMF C19 H12 Cl2 O2



CM 2

CRN 90-98-2

CMF C13 H8 Cl2 O



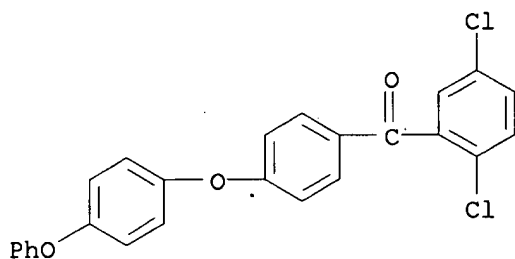
RN 463963-71-5 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 463954-50-9

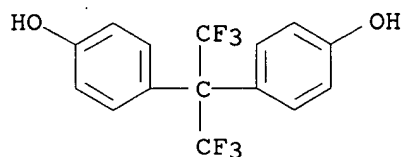
CMF C25 H16 Cl2 O3



CM 2

CRN 1478-61-1

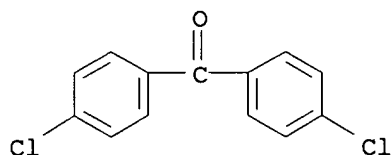
CMF C15 H10 F6 O2



CM 3

CRN 90-98-2

CMF C13 H8 Cl2 O



L16 ANSWER 4 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2003:173096 HCAPLUS

DN 138:207828

TI Polymer **electrolyte** composition and **fuel cell**

IN Hidaka, Yasuaki; Iwasaki, Katsuhiko

PA Sumitomo Chemical Company, Limited, Japan

SO Eur. Pat. Appl., 23 pp.

CODEN: EPXXDW

DT Patent

LA English

IC ICM H01M008-10

ICS C08K005-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1289041	A2	20030305	EP 2002-17695	20020807
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK				
	JP 2003151346	A2	20030523	JP 2002-145863	20020521
	CN 1405217	A	20030326	CN 2002-142573	20020807
PRAI	JP 2001-241897	A	20010809		
	JP 2001-261127	A	20010830		
OS	MARPAT 138:207828				
AB	A polymer <b>electrolyte</b> compn. comprising a polymer <b>electrolyte</b> and at least one of antioxidant selected from a group which consists of an antioxidant contg. trivalent phosphorous and a sulfur-contg. antioxidant is provided as a polymer <b>electrolyte</b> compn. superior in radical resistance property.				
ST	polymer <b>electrolyte</b> compn antioxidant additive <b>fuel cell</b>				
IT	Organic compounds, uses RL: TEM (Technical or engineered material use); USES (Uses) (aliph., polymers, porous support; polymer <b>electrolyte</b> compn. and <b>fuel cell</b> )				
IT	Antioxidants <b>Fuel cell electrolytes</b> Solid state <b>fuel cells</b> (polymer <b>electrolyte</b> compn. and <b>fuel cell</b> )				
IT	Fluoropolymers, uses RL: TEM (Technical or engineered material use); USES (Uses) (porous support; polymer <b>electrolyte</b> compn. and <b>fuel cell</b> )				
IT	85-60-9, SUMILIZER BBM-S 96-69-5, SUMILIZER WX-R 123-28-4, SUMILIZER TPL-R 693-36-7, SUMILIZER TPS 3806-34-6, ADK Stab PEP-8 16545-54-3, SUMILIZER TPM 26741-53-7, Ultrinox 626 29598-76-3, SUMILIZER TP-D 31570-04-4, Sumilizer P-16 80693-00-1 140221-14-3 147192-62-9, GSYP-101 153550-59-5, Sandostab P-EPQ 203255-81-6, Sumilizer GP RL: MOA (Modifier or additive use); USES (Uses) (antioxidant; polymer <b>electrolyte</b> compn. and <b>fuel cell</b> )				
IT	90-43-7DP, [1,1'-Biphenyl]-2-ol, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated 92-88-6DP, [1,1'-Biphenyl]-4,4'-diol, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated 345-92-6DP, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated 25667-42-9DP, Sumikaexcel PES 5003P, polymer contg., reaction product with hydroxy-terminated polyether sulfone and 4,4'-difluorobenzophenone, sulfonated <b>83094-08-0DP</b> , 4,4'-Dichlorodiphenyl sulfone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenyl sulfone copolymer, sulfonated RL: DEV (Device component use); <b>SPN (Synthetic preparation)</b> ; <b>PREP (Preparation)</b> ; USES (Uses) (polymer <b>electrolyte</b> compn. and <b>fuel cell</b> )				
IT	<b>83094-08-0DP</b> , 4,4'-Dichlorodiphenyl sulfone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenyl sulfone copolymer, sulfonated RL: DEV (Device component use); <b>SPN (Synthetic preparation)</b> ; <b>PREP (Preparation)</b> ; USES (Uses)				

(polymer **electrolyte** compn. and **fuel cell**)

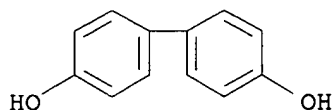
RN 83094-08-0 HCAPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

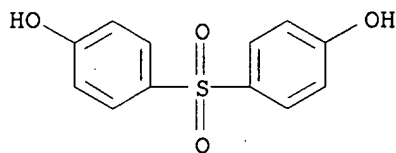
CMF C12 H10 O2



CM 2

CRN 80-09-1

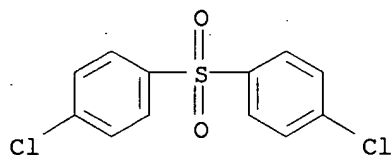
CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



L16 ANSWER 5 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2003:48988 HCAPLUS

DN 138:356103

TI Fabrication and characterization of heteropoly acid (H3PW12O40)/directly polymerized sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for higher temperature **fuel cell** applications

AU Kim, Yu Seung; Wang, Feng; Hickner, Michael; Zawodzinski, Thomas A.; McGrath, James E.

CS Materials Research Institute, Department of Chemistry, Virginia

- Polytechnic Institute and State University, Blacksburg, VA, 24061, USA
- SO Journal of Membrane Science (2003), 212(1-2), 263-282  
CODEN: JMESDO; ISSN: 0376-7388
- PB Elsevier Science B.V.
- DT Journal
- LA English
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38
- AB The feasibility of heteropoly acid (HPA)/sulfonated poly(arylene ether sulfone) composite **membranes** for use in proton exchange **membrane fuel cells** was investigated. Partially disulfonated poly(arylene ether sulfone)s (BPSH) copolymers were prep'd. by direct arom. nucleophilic copolymn. and soln.-blended with a com. HPA, phosphotungstic acid (H3PW12O40). Fourier transform IR spectroscopy band shifts showed that sulfonic acid groups on the polymer backbone interact with both bridging tungstic oxide and terminal tungstic oxide in the phosphotungstic acid mol., indicative of an intermol. hydrogen bonding interaction between the copolymer and the HPA additive. The composite **membranes** generally exhibited a low HPA extn. after water vapor treatment, except for the 60 mol% disulfonated BPSH where significant HPA extn. from the composite **membrane** occurred because of excessive matrix swelling. The composite **membrane** not only had good thermal stability (decompn. temp. in nitrogen >300.degree.), but also showed improved mech. strength and lower water uptake than the unfilled **membranes**. The composite **membranes** displayed good proton cond. esp. at elevated temps. (e.g. 130.degree.). For example, fully hydrated **membranes** consisting of 30 wt.% HPA and 70 wt.% BPSH with 40 mol% disulfonation had a cond. of 0.08 S/cm at room temp. which linearly increased up to 0.15 S/cm at 130.degree.. In contrast, the pure copolymer had a proton cond. of 0.07 S/cm at temp. and only reached a max. cond. of 0.09 S/cm, most probably due to dehydration at elevated temps. The dehydration process was monitored by dynamic IR spectra by observing the intensity redn. of the sulfonate group and distinctive changes of shape in the hydroxyl vibrations as the sample was heated. Combining IR results with dynamic thermogravimetric data showed that the composite **membrane** had much higher water retention (at 100-280.degree.) than the pure sulfonated copolymer. Incorporation of HPA into these proton-conducting copolymers should be good candidates for elevated temp. operation of proton exchange **membrane fuel cells**.
- ST proton exchange **fuel cell membrane**  
sulfonated polyether polysulfone; tungstophosphate sulfonated polyether polysulfone **fuel cell membrane**; dehydration  
polyether polysulfone **fuel cell membrane**
- IT Polysulfones, uses  
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(polyether-, **membranes** with variable sulfonic acid content; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polyimd. sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for high-temp. **fuel cell** applications)
- IT Polyethers, uses  
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(polysulfone-, **membranes** with variable sulfonic acid content; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polyimd. sulfonated poly(arylene ether sulfone) copolymer composite

- membranes** for high-temp. **fuel cell** applications)
- IT **Fuel cell** separators  
(proton-exchange; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for high-temp. **fuel cell** applications)
- IT Ionic conductivity  
(proton; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for high-temp. **fuel cell** applications)
- IT Functional groups  
(sulfo group; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for high-temp. **fuel cell** applications)
- IT Functional groups  
(sulfonyl group, FT-IR of; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for high-temp. **fuel cell** applications)
- IT Dehydration  
Hydrogen bond  
Swelling, physical  
(synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for high-temp. **fuel cell** applications)
- IT Heteropoly acids  
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(tungstophosphates, composite **membranes**; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for high-temp. **fuel cell** applications)
- IT 1343-93-7P  
RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(composite **membranes**; synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for high-temp. **fuel cell** applications)
- IT **267877-35-0P**, Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene]  
RL: DEV (Device component use); PRP (Properties); **SPN (Synthetic preparation); PREP (Preparation); USES (Uses)**  
(synthesis and characterization of heteropoly acid (H3PW12O40)/directly polymd. sulfonated poly(arylene ether sulfone) copolymer composite **membranes** for high-temp. **fuel cell** applications)

RE.CNT 41 THERE ARE 41 CITED REFERENCES AVAILABLE FOR THIS RECORD  
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IT 267877-35-0P, Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene]

RL: DEV (Device component use); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)

(synthesis and characterization of heteropoly acid (H3PW12O40)/directly polyimd. sulfonated poly(arylene ether sulfone) copolymer composite membranes for high-temp. fuel cell applications)

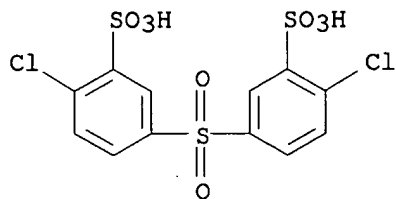
RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

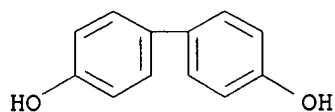
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● 2 Na

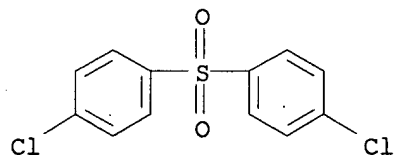
CM 2

CRN 92-88-6  
CMF C12 H10 O2



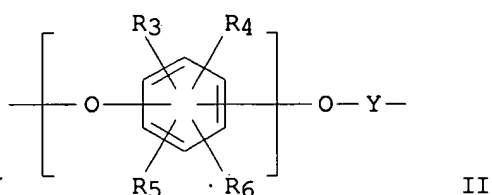
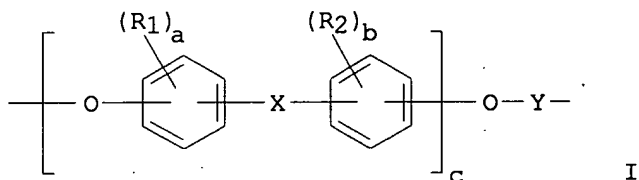
CM 3

CRN 80-07-9  
CMF C12 H8 Cl2 O2 S



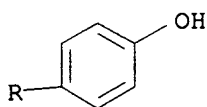
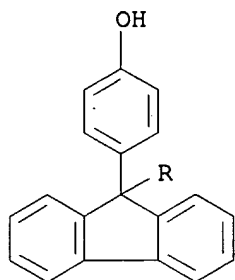
L16 ANSWER 6 OF 30 HCAPLUS COPYRIGHT 2003 ACS  
AN 2002:962359 HCAPLUS  
DN 138:42024  
TI Electrode-electrolyte laminate for polymer electrolyte fuel cell  
IN Nanaumi, Masaaki; Asano, Yoichi; Kanaoka, Osayuki; Soma, Hiroshi  
PA Honda Motor Co., Ltd., Japan  
SO Jpn. Kokai Tokkyo Koho, 9 pp.  
CODEN: JKXXAF  
DT Patent  
LA Japanese  
IC ICM H01M008-02  
ICS C08G065-48; H01M004-96; H01M008-10  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002367629	A2	20021220	JP 2001-176696	20010612
PRAI	JP 2001-176696		20010612		
GI					

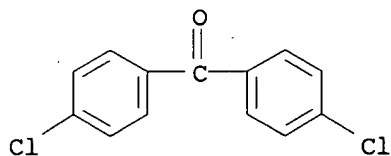


- AB The laminate has a polymer electrolyte membrane between a pair of electrodes, where the electrodes has a catalyst layer, contg. 0.01-0.6 mg Pt/cm<sup>2</sup> loaded on carbonaceous supports having av. particle diam. 10-100 nm, and the electrolyte is a sulfonated polyether contg. repeating units I (X = electron attracting group, R1 and R2 = H or monovalent hydrocarbon groups, a and b = 0-4 integer, c = 0 or 1, Y = different substituted arom group), or II (R3-6 = H, halogen, or cyano group with at least one of R3-6 = halogen or cyano group).
- ST fuel cell sulfonated polyether electrolyte; platinum carbon catalyst fuel cell electrode; electrode polymer electrolyte laminate fuel cell
- IT Fuel cell electrodes  
(carbon black supports with controlled diam. for platinum catalytic electrodes in fuel cells with sulfonated polyether electrolyte membranes)
- IT Carbon black, uses  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(carbon black supports with controlled diam. for platinum catalytic electrodes in fuel cells with sulfonated polyether electrolyte membranes)
- IT Fuel cells  
(fuel cells with sulfonated polyether electrolyte membranes between platinum catalytic electrodes)
- IT Fuel cell electrolytes  
(sulfonated polyether electrolyte membranes for fuel cells with platinum catalytic electrodes)
- IT 7440-06-4, Platinum, uses  
RL: CAT (Catalyst use); USES (Uses)  
(platinum catalytic electrodes in fuel cells with sulfonated polyether electrolyte membranes)
- IT 41206-07-9D, sulfonated 107087-84-3D, sulfonated 353454-44-1D, sulfonated 478976-55-5D, sulfonated  
RL: DEV (Device component use); USES (Uses)  
(sulfonated polyether electrolyte membranes for

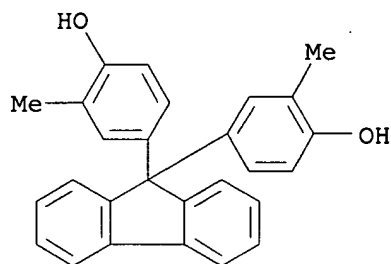
fuel cells with platinum catalytic electrodes)  
 IT 107087-84-3D, sulfonated 478976-55-5D, sulfonated  
 RL: DEV (Device component use); USES (Uses)  
 (sulfonated polyether **electrolyte membranes** for  
 fuel cells with platinum catalytic electrodes)  
 RN 107087-84-3 HCAPLUS  
 CN Methanone, bis(4-chlorophenyl)-, polymer with 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 3236-71-3  
 CMF C25 H18 O2



CM 2  
 CRN 90-98-2  
 CMF C13 H8 Cl2 O



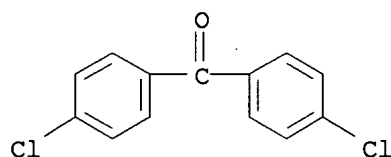
RN 478976-55-5 HCAPLUS  
 CN Methanone, bis(4-chlorophenyl)-, polymer with 4,4'-(9H-fluoren-9-ylidene)bis[2-methylphenol] (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 88938-12-9  
 CMF C27 H22 O2



CM 2

CRN 90-98-2

CMF C13 H8 C12 O



L16 ANSWER 7 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2002:772171 HCAPLUS

DN 137:297365

TI Process for preparation of polymer **electrolyte** for use as separator in electrochemical devices

IN Shinoda, Hiroshi; Iwasaki, Katsuhiko; Terahara, Atsushi

PA Sumitomo Chemical Company, Limited, Japan

SO Eur. Pat. Appl., 16 pp.

CODEN: EPXXDW

DT Patent

LA English

IC ICM H01M008-10

ICS H01M010-40; C08J005-22; C07C311-48; C07C303-36; H01B001-12

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1248313	A2	20021009	EP 2002-7287	20020402
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
	US 2002187377	A1	20021212	US 2002-108441	20020329
PRAI	JP 2001-105596	A	20010404		
	JP 2001-297814	A	20010927		
	JP 2001-376904	A	20011211		
AB	A polymer <b>electrolyte</b> has, in a main chain, a structural unit represented by the formula: $-\text{[Ar1-(SO}_2\text{-N(X+)-SO}_2\text{-Ar2)}_m\text{-SO}_2\text{-N(X+)-SO}_2\text{-Ar1-O]}_n$ , where Ar1 and Ar2 independently represent a divalent arom. groups, m represents an integer of 0-3, and X+ represents an ion selected from H+, an alkali metal ion, and NH <sub>4</sub> <sup>+</sup> . The polymer <b>electrolyte</b> is sol. in solvents and has excellent film-forming property and recycling				

efficiency.

ST battery separator polymer **electrolyte** prepn; **fuel**  
**cell** separator polymer **electrolyte** prepn

IT Ion exchange  
(capacity; process for prepn. of polymer **electrolyte** for use  
as separator in electrochem. devices)

IT Fluoropolymers, uses  
RL: DEV (Device component use); USES (Uses)  
(composite **membrane** with; process for prepn. of polymer  
**electrolyte** for use as separator in electrochem. devices)

IT **Fuel cell** separators  
Polymer **electrolytes**  
Primary battery separators  
Secondary battery separators  
(process for prepn. of polymer **electrolyte** for use as  
separator in electrochem. devices)

IT Ionic conductivity  
(proton; process for prepn. of polymer **electrolyte** for use as  
separator in electrochem. devices)

IT 9002-84-0, Ptfе  
RL: DEV (Device component use); USES (Uses)  
(composite **membrane** with; process for prepn. of polymer  
**electrolyte** for use as separator in electrochem. devices)

IT 468082-63-5P 468082-65-7P **468082-66-8P** 468082-67-9P  
468082-68-0P **468082-69-1P** **468082-70-4P**  
RL: DEV (Device component use); **SPN (Synthetic preparation);**  
**PREP (Preparation);** USES (Uses)  
(process for prepn. of polymer **electrolyte** for use as  
separator in electrochem. devices)

IT **468082-66-8P** **468082-69-1P** **468082-70-4P**  
RL: DEV (Device component use); **SPN (Synthetic preparation);**  
**PREP (Preparation);** USES (Uses)  
(process for prepn. of polymer **electrolyte** for use as  
separator in electrochem. devices)

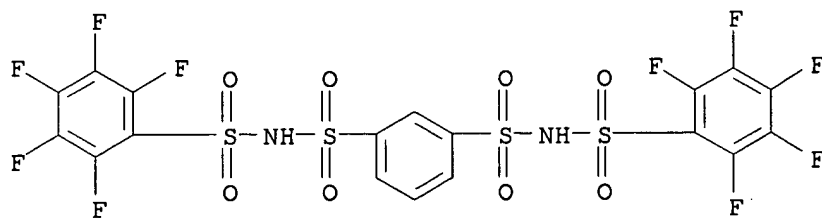
RN 468082-66-8 HCAPLUS

CN 1,3-Benzenedisulfonamide, N,N'-bis[(pentafluorophenyl)sulfonyl]-,  
dipotassium salt, polymer with 4,4'-(1-methylethylidene)bis[phenol],  
1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol], block  
(9CI) (CA INDEX NAME)

CM 1

CRN 468082-62-4

CMF C18 H6 F10 N2 O8 S4 . 2 K

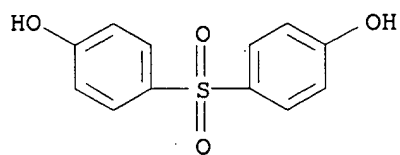


● 2 K

CM 2

CRN 80-09-1

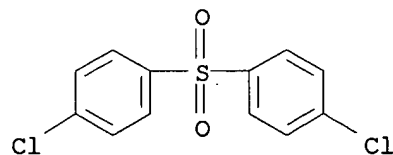
CMF C12 H10 O4 S



CM 3

CRN 80-07-9

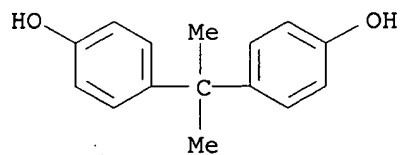
CMF C12 H8 Cl2 O2 S



CM 4

CRN 80-05-7

CMF C15 H16 O2



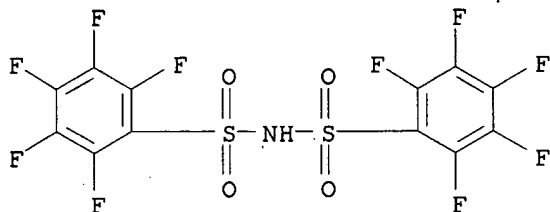
RN 468082-69-1 HCAPLUS

CN Benzenesulfonamide, 2,3,4,5,6-pentafluoro-N-[(pentafluorophenyl)sulfonyl]-, potassium salt, polymer with 1,4-benzenediol, 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol], block (9CI) (CA INDEX NAME)

CM 1

CRN 299914-08-2

CMF C12 H F10 N O4 S2 . K

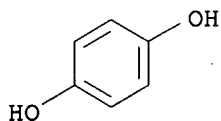


● K

CM 2

CRN 123-31-9

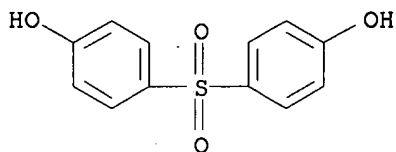
CMF C6 H6 O2



CM 3

CRN 80-09-1

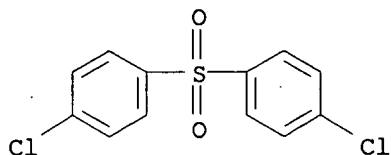
CMF C12 H10 O4 S



CM 4

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



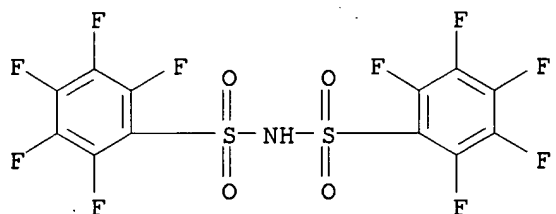
RN 468082-70-4 HCAPLUS

CN Benzenesulfonic acid, 2,5-dihydroxy-, monopotassium salt, polymer with 2,3,4,5,6-pentafluoro-N-[(pentafluorophenyl)sulfonyl]benzenesulfonamide potassium salt, 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol], block (9CI) (CA INDEX NAME)

CM 1

CRN 299914-08-2

CMF C12 H F10 N O4 S2 . K

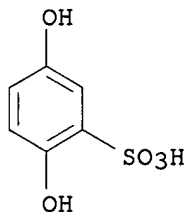


● K

CM 2

CRN 21799-87-1

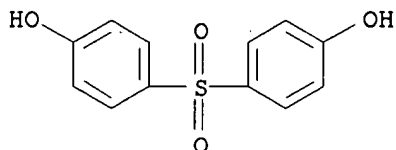
CMF C6 H6 O5 S . K



● K

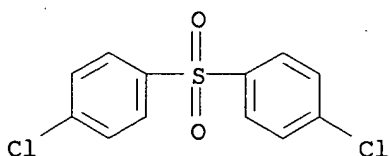
CM 3

CRN 80-09-1  
CMF C12 H10 O4 S



CM 4

CRN 80-07-9  
CMF C12 H8 C12 O2 S

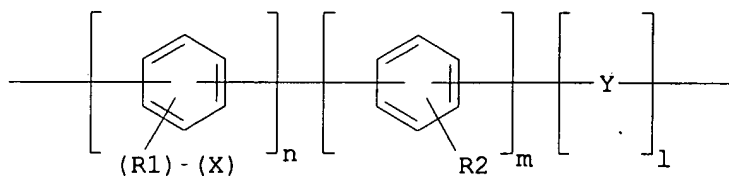


L16 ANSWER 8 OF 30 HCAPLUS COPYRIGHT 2003 ACS  
AN 2002:752573 HCAPLUS  
DN 137:281852  
TI Ion-conducting polymer, **membrane** of the conducting polymer, and **fuel cell**  
IN Morizono, Kenichi; Tsukamoto, Koji  
PA Mitsui Chemicals Inc., Japan  
SO Jpn. Kokai Tokkyo Koho, 9 pp.  
CODEN: JKXXAF  
DT Patent  
LA Japanese  
IC ICM H01M008-02  
ICS C08G061-10; H01M008-10  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002289222	A2	20021004	JP 2001-88889	20010326
PRAI	JP 2001-88889		20010326		

GI



I

AB The polymer has protonic acid groups attached to a polymer main chain via spacer structures having  $\geq 1$  C atoms. The polymer is preferably I, where R1 and R2 are H or various substituents, Y = single bond, arylen, heteroarylene group, various org. and inorg. groups or a combination thereof; n = integer  $\geq 1$ , m and l = integer  $\geq 0$ , and  $(l+m+n) \geq 4$ . The polymer is useful as **electrolyte membrane** for **fuel cells**.

ST **fuel cell electrolyte** ion conducting polymer membrane

IT **Fuel cell electrolytes**

(structure of proton conducting polymers for **electrolyte membranes** in **fuel cells**)

IT 466696-81-1P 466696-82-2P **466696-83-3P**

RL: DEV (Device component use); **IMF (Industrial manufacture)**;

PRP (Properties); **PREP (Preparation)**; USES (Uses)

(structure of proton conducting polymers for **electrolyte membranes** in **fuel cells**)

IT **466696-83-3P**

RL: DEV (Device component use); **IMF (Industrial manufacture)**;

PRP (Properties); **PREP (Preparation)**; USES (Uses)

(structure of proton conducting polymers for **electrolyte membranes** in **fuel cells**)

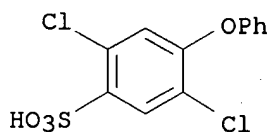
RN 466696-83-3 HCAPLUS

CN Benzenesulfonic acid, 2,5-dichloro-4-phenoxy-, polymer with bis(4-chlorophenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 466696-80-0

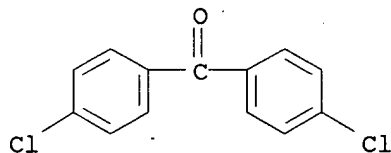
CMF C12 H8 C12 O4 S



CM 2

CRN 90-98-2

CMF C13 H8 C12 O



L16 ANSWER 9 OF 30 HCAPLUS COPYRIGHT 2003 ACS

KATHLEEN FULLER EIC 1700/PARKER LAW 308-4290

AN 2002:736549 HCAPLUS  
 DN 137:265674  
 TI **Fuel cell** powered by direct fuel  
 IN Andrews, Mark James; Lockley, John Edward; Wilson, Brian  
 PA Victrex Manufacturing Limited, UK  
 SO PCT Int. Appl., 72 pp.  
 CODEN: PIXXD2  
 DT Patent  
 LA English  
 IC ICM H01M008-10  
 ICS B01D071-06; C08G065-48; C08J005-22; H01B001-12  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002075835	A2	20020926	WO 2002-GB1379	20020321
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
PRAI	GB 2001-7075	A	20010321		
	GB 2001-23085	A	20010926		
AB	A <b>fuel cell</b> powered by direct fuel, for example a direct methanol <b>fuel cell</b> , includes a polymer <b>electrolyte membrane</b> which includes a semicryst. polymer. Preferred semicryst. polymers include first repeat units comprising sulfonated arom. group contg. moieties linked by -SO <sub>2</sub> - and/or -CO- and/or -Q-groups, where Q is O or S and second repeat units which include arom. group contg. moieties linked by -CO- and/or Q groups.				
ST	<b>fuel cell</b> power direct <b>fuel</b> ; methanol direct				
	use <b>fuel cell</b>				
IT	Crystallinity				
	<b>Fuel cell electrolytes</b>				
	Solid state <b>fuel cells</b>				
	(fuel cell powered by direct fuel)				
IT	Polysulfones, uses				
	RL: DEV (Device component use); USES (Uses)				
	(polyether-; <b>fuel cell</b> powered by direct fuel)				
IT	Polyethers, uses				
	RL: DEV (Device component use); USES (Uses)				
	(polysulfone-; <b>fuel cell</b> powered by direct fuel)				
IT	Polymers, uses				
	RL: DEV (Device component use); USES (Uses)				
	(semicryst., sulfonated; <b>fuel cell</b> powered by direct fuel)				
IT	27380-27-4DP, sulfonated 31694-16-3DP, PEEK 450P, sulfonated				
	128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-				
	dihydroxybenzophenone copolymer, sulfonated 128324-23-2P,				
	4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-				
	dihydroxybiphenyl copolymer 128324-24-3DP, 4,4'-Difluorobenzophenone-				
	4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated				

128324-24-3P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer 361482-41-9DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated 361482-41-9P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer 361482-42-0DP, 4,4'-Difluorobenzophenone-2,4'-dihydroxybenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer, sulfonated 361482-42-0P, 4,4'-Difluorobenzophenone-2,4'-dihydroxybenzophenone-4,4'-dihydroxybenzophenone 4,4'-dihydroxybiphenyl copolymer

**362518-55-6P** 362518-57-8P

RL: DEV (Device component use); **SPN (Synthetic preparation);**

**PREP (Preparation);** USES (Uses)

(fuel cell powered by direct fuel)

IT 67-64-1, Acetone, uses

RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)

(fuel cell powered by direct fuel)

IT **362518-55-6P**

RL: DEV (Device component use); **SPN (Synthetic preparation);**

**PREP (Preparation);** USES (Uses)

(fuel cell powered by direct fuel)

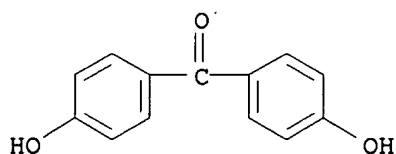
RN 362518-55-6 HCAPLUS

CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol, bis(4-hydroxyphenyl)methanone and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 611-99-4

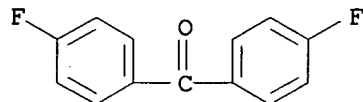
CMF C13 H10 O3



CM 2

CRN 345-92-6

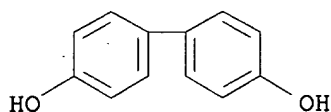
CMF C13 H8 F2 O



CM 3

CRN 92-88-6

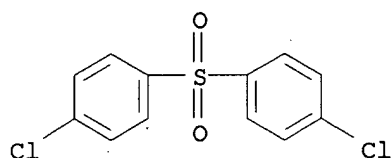
CMF C12 H10 O2



CM 4

CRN 80-07-9

CMF C12 H8 C12 O2 S



L16 ANSWER 10 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2002:693172 HCAPLUS

DN 137:201741

TI Aromatic polyether containing phosphonate groups and a process for the manufacture thereof

IN Sasaki, Shigeru; Yashiro, Arihiro; Hidaka, Yasuaki

PA Sumitomo Chemical Company, Limited, Japan

SO Eur. Pat. Appl., 15 pp.

CODEN: EPXXDW

DT Patent

LA English

IC ICM C08G075-23

ICS C08G065-48; B01D071-52; B01D071-68

CC 35-5 (Chemistry of Synthetic High Polymers)

Section cross-reference(s): 52

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1238998	A1	20020911	EP 2002-3124	20020213
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
	JP 2002241493	A2	20020828	JP 2001-38116	20010215
PRAI	JP 2001-38116	A	20010215		
	JP 2001-125501	A	20010424		
	JP 2001-379819	A	20011213		
AB	Provided is an arom. polymer phosphonic acid deriv. in which a phosphonic acid deriv. group is directly bound to an arom. ring. The arom. polymer phosphonic acid deriv. can be produced by brominating a specific arom. polymer compd. with a brominating agent, then acting thereon trialkyl phosphite in the presence of a nickel halide catalyst to give a phosphonic acid di-ester, and further, by hydrolyzing the di-ester. The arom. polymer phosphonic acid deriv. is excellent in radical resistance and used for a solid polymer type <b>fuel cell</b> . A polymer with				

repeating unit p-C6H4SO2-p-C6H4O-p-C6H4-pC6H4O was brominated with N-bromosuccinimide, then treated with tri-Et phosphate.

ST arom polyether phosphonate group **electrolyte membrane**

IT Bromination  
Polymer **electrolytes**  
(arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT Polyoxyarylenes  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(phosphonate group-contg.; arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT Polysulfones, preparation  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyether-, phosphonate group-contg.; arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT **Membranes**, nonbiological  
(polymer **electrolyte**; arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT Polyethers, preparation  
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polysulfone-, phosphonate group-contg.; arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT 7718-54-9, Nickel (II) chloride, uses  
RL: CAT (Catalyst use); USES (Uses)  
(arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

IT 122-52-1DP, Triethyl phosphite, reaction products with brominated polyether-polysulfones 25839-81-ODP, brominated, reaction products with tri-Et phosphite **83094-08-ODP**, 4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, brominated  
RL: **IMF (Industrial manufacture)**; PRP (Properties); TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
(arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Carreno, M; JOURNAL OF ORGANIC CHEMISTRY 1995, V60(16), P5328 HCAPLUS  
(2) Djerassi, C; CHEMICAL REVIEWS 1984, P271  
(3) Guiver, M; US 4996271 A 1991 HCAPLUS  
(4) Jagur-Grodzinski, J; US 4008191 A 1977 HCAPLUS  
(5) Kerres, J; WO 0066254 A 2000 HCAPLUS  
(6) Khattab, G; US 3748306 A 1973 HCAPLUS

IT **83094-08-ODP**, 4,4'-Biphenol-4,4'-dichlorodiphenyl sulfone-4,4'-dihydroxydiphenyl sulfone copolymer, brominated  
RL: **IMF (Industrial manufacture)**; PRP (Properties); TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
(arom. polyether contg. phosphonate groups and a process for the manuf. thereof)

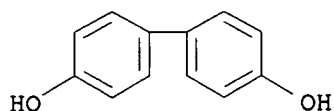
RN 83094-08-0 HCAPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

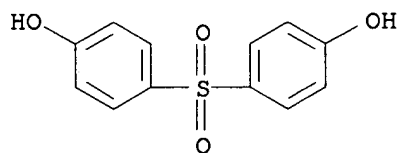
CMF C12 H10 O2



CM 2

CRN 80-09-1

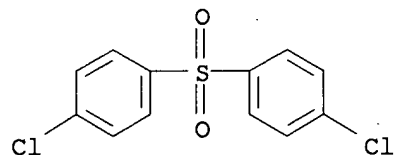
CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



L16 ANSWER 11 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2002:685669 HCAPLUS

DN 137:353708

TI Carboxylated and Sulfonated Poly(arylene-co-arylene sulfone)s:  
Thermostable Polyelectrolytes for **Fuel Cell**  
Applications

AU Poppe, D.; Frey, H.; Kreuer, K. D.; Heinzl, A.; Muelhaupt, R.

CS Freiburger Materialforschungszentrum und Institut fuer Makromolekulare  
Chemie, Albert-Ludwigs Universitaet, Freiburg, D-79104, Germany

SO Macromolecules (2002), 35(21), 7936-7941

CODEN: MAMOBX; ISSN: 0024-9297

PB American Chemical Society

DT Journal

LA English

CC 37-3 (Plastics Manufacture and Processing)

Section cross-reference(s): 52

- AB The synthesis of novel sol. copolyarylenes, their functionalization with sulfonic and carboxylic acid groups, and the detn. of parameters (swelling behavior, MeOH permeation, and ionic cond.) relevant to use as **fuel cells** are described. The Ni(0)-catalyzed homocoupling reaction of aryl chlorides was employed for the polymns. Carboxylic acid groups were incorporated by copolymn. of Me 2,5-dichlorobenzoate and subsequent hydrolysis. The compn. varied from 53-100 % carboxylic acid groups. Sulfonic acid groups were introduced by sulfonation with chlorosulfonic acid. Flexible and transparent **membranes** with sulfonic and/or carboxylic acid groups were prepd. that exhibited higher proton conductivities (values in the range of .sigma. = 0.11-0.23 S/cm) compared to those of Nafion and sulfonated PEEK as a result of higher ion exchange capacity and water content. Incorporation of carboxylic acid groups led to a reduced water uptake but lower conductivities.
- ST carboxylated sulfonated arom thermostable polyelectrolyte **fuel cell**
- IT Polysulfones, preparation  
 RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (arom.; carboxylated and sulfonated poly(arylene-co-arylene sulfone)s as thermostable polyelectrolytes for **fuel cell** applications)
- IT **Fuel cells**  
 Ionic conductivity  
 Thermal stability  
 (carboxylated and sulfonated poly(arylene-co-arylene sulfone)s as thermostable polyelectrolytes for **fuel cell** applications)
- IT **474383-94-3DP**, 1,3-Dichlorobenzene-4,4'-dichlorodiphenyl sulfone copolymer, sulfonated **474383-95-4DP**, 1,3-Dichlorobenzene-4,4'-dichlorodiphenyl sulfone-methyl 2,5-dichlorobenzoate copolymer, hydrolyzed  
 RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (carboxylated and sulfonated poly(arylene-co-arylene sulfone)s as thermostable polyelectrolytes for **fuel cell** applications)
- RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD
- RE
- (1) Bloom, P; J Polym Sci, Part A: Polym Chem 2001, V39, P3505 HCAPLUS
  - (2) Bloom, P; Macromolecules 2001, V34, P1627 HCAPLUS
  - (3) Chaturvedi, V; Macromolecules 1993, V26, P2607 HCAPLUS
  - (4) Colon, I; J Org Chem 1986, V51, P2627 HCAPLUS
  - (5) Colon, I; J Polym Sci, Part A: Polym Chem 1990, V28, P367 HCAPLUS
  - (6) Ghassemi, H; Polymer 1997, V38, P3139 HCAPLUS
  - (7) Grob, M; Macromolecules 1996, V29, P7284 HCAPLUS
  - (8) Havelka-Rivard, P; Macromolecules 1999, V32, P6418 HCAPLUS
  - (9) Kaeriyama, K; Synth Met 1995, V69, P507 HCAPLUS
  - (10) Kwiatkowski, G; J Macromol Sci, Pure Appl Chem 1997, VA34, P1945 HCAPLUS
  - (11) Mulhaupt, R; DE 19535086 A1 1995 HCAPLUS
  - (12) Percec, V; Macromolecules 1992, V25, P1816 HCAPLUS
  - (13) Percec, V; Macromolecules 1999, V32, P2597 HCAPLUS
  - (14) Phillips, R; Macromolecules 1994, V27, P2354 HCAPLUS
  - (15) Poppe, D; Polym Mater:Sci Eng (Am Chem Soc) 2001, V84(1), P333
  - (16) Rehahn, M; Polymer 1989, V30, P1054 HCAPLUS
  - (17) Wallow, T; J Am Chem Soc 1991, V113, P7411 HCAPLUS
  - (18) Wallow, T; Polym Prepr 1992, V33(1), P908 HCAPLUS
- IT **474383-94-3DP**, 1,3-Dichlorobenzene-4,4'-dichlorodiphenyl sulfone

copolymer, sulfonated **474383-95-4DP**, 1,3-Dichlorobenzene-4,4'-dichlorodiphenyl sulfone-methyl 2,5-dichlorobenzoate copolymer, hydrolyzed  
 RL: **SPN (Synthetic preparation)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
 (carboxylated and sulfonated poly(arylene-co-arylene sulfone)s as thermostable polyelectrolytes for **fuel cell** applications)

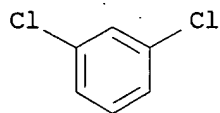
RN 474383-94-3 HCAPLUS

CN Benzene, 1,1'-sulfonylbis[4-chloro-, polymer with 1,3-dichlorobenzene (9CI) (CA INDEX NAME)

CM 1

CRN 541-73-1

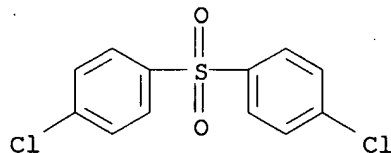
CMF C6 H4 Cl2



CM 2

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



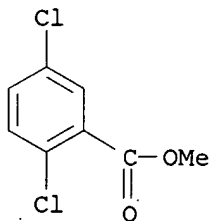
RN 474383-95-4 HCAPLUS

CN Benzoic acid, 2,5-dichloro-, methyl ester, polymer with 1,3-dichlorobenzene and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

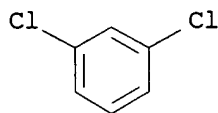
CRN 2905-69-3

CMF C8 H6 Cl2 O2



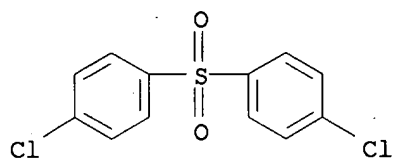
CM 2

CRN 541-73-1  
CMF C6 H4 Cl2



CM 3

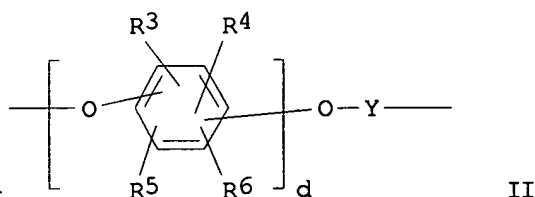
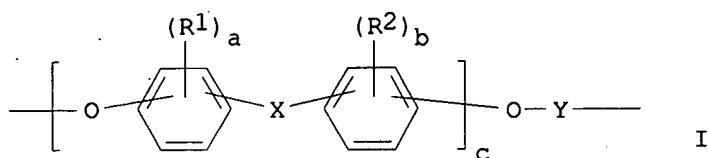
CRN 80-07-9  
CMF Cl2 H8 Cl2 O2 S



L16 ANSWER 12 OF 30 HCAPLUS COPYRIGHT 2003 ACS  
AN 2002:606433 HCAPLUS  
DN 137:155541  
TI Aromatic polyethers with good sulfonation controllability and proton  
conductive membranes using them  
IN Goto, Kohei; Kakuta, Mayumi; Takahashi, Masayuki  
PA JSR Ltd., Japan  
SO Jpn. Kokai Tokkyo Koho, 13 pp.  
CODEN: JKXXAF  
DT Patent  
LA Japanese  
IC ICM C08G065-34  
ICS B01D071-52; B01D071-66; C08G065-48; C08J005-22; H01B001-06;  
H01B001-12; H01M006-18; H01M008-02; H01M010-40; C08L071-08  
CC 37-3 (Plastics Manufacture and Processing)  
Section cross-reference(s): 38, 52, 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002226575	A2	20020814	JP 2001-22639	20010131
PRAI	JP 2001-22639		20010131		
GI					



AB The invention relates to polyethers with Mw 10,000-1,000,000 having repeating units I or II (X = electron-withdrawing divalent group; R1, R2 = H, hydrocarbyl; a, b = 0-4; c = 0, 1; Y = aryl-contg. phenylene, biphenylene group, fluorene group, etc.; R3-6 = H, halo, cyano; d = 1, 2), useful for batteries, capacitors, etc. Thus, 2,5-dihydroxy-4'-methylbiphenyl-4,4'-difluorobenzophenone copolymer was sulfonated and molded into a film showing proton cond. 2.12 .times. 10<sup>-3</sup> S/cm, elastic modulus 2.69 GPa, tensile strength 88 MPa, and elongation at break 29%.

ST arom polyether sulfonation proton conductive membrane; fluorobenzophenone hydroxymethylbiphenyl polyether polyketone conductive film

IT Polymer **electrolytes**

(arom. polyethers with good sulfonation controllability for proton conductive **membranes**)

IT Membranes, nonbiological

(elec. conductive; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polyketones

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polyether-, cardo, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polyketones

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polyether-, arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polysulfones, preparation

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polyether-polyketone-, cardo, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Polysulfones, preparation

RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polyether-polyketone-, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)

IT Cardo polymers

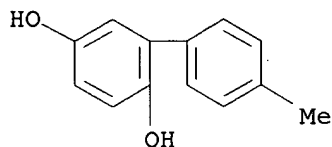
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

- (polyether-polyketone-polysulfones, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)
- IT Cardo polymers  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-polyketones, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)
- IT Polyketones  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-polysulfone-, cardo, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)
- IT Polyketones  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-polysulfone-, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)
- IT Polyethers, preparation  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-, cardo, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)
- IT Polyethers, preparation  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-, arom. polyethers with good sulfonation controllability for proton conductive membranes)
- IT Polyethers, preparation  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-polysulfone-, cardo, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)
- IT Polyethers, preparation  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-polysulfone-, sulfonated; arom. polyethers with good sulfonation controllability for proton conductive membranes)
- IT 40793-56-4DP, 9,9-Bis(4-hydroxyphenyl)fluorene-4,4'-difluorobenzophenone copolymer, sulfonated 41206-07-9DP, sulfonated 118546-87-5DP, sulfonated 125431-09-6DP, sulfonated 445483-05-6DP, 4,4'-Difluorobenzophenone-2,5-dihydroxy-4'-methylbiphenyl copolymer, sulfonated 445483-06-7DP, sulfonated 445483-07-8DP, 9,9-Bis(4-hydroxyphenyl)fluorene-bis(4-hydroxyphenyl)sulfone-4,4'-difluorobenzophenone copolymer, sulfonated 446035-10-5DP, sulfonated  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (arom. polyethers with good sulfonation controllability for proton conductive membranes)
- IT 445483-06-7DP, sulfonated  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (arom. polyethers with good sulfonation controllability for proton conductive membranes)
- RN 445483-06-7 HCAPLUS
- CN Methanone, bis(4-fluorophenyl)-, polymer with 4'-methyl[1,1'-biphenyl]-2,5-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 10551-32-3

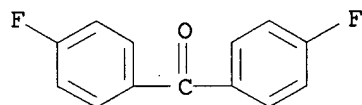
CMF C13 H12 O2



CM 2

CRN 345-92-6

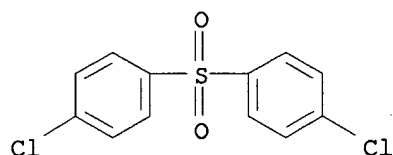
CMF C13 H8 F2 O



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



L16 ANSWER 13 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2002:592052 HCAPLUS

DN 137:141500

TI Sulfonated aromatic polymer compositions, their films, and their use as protonic conductors

IN Goto, Kohei; Takahashi, Masayuki; Onoe, Koichi; Yamakawa, Yoshitaka

PA JSR Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 22 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C08L071-00

ICS C08G065-40; C08G065-48; C08J005-18; C08L009-02; C08L021-00

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 52, 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002220530	A2	20020809	JP 2001-19377	20010129
PRAI	JP 2001-19377		20010129		
AB	<p>The proton conductors, useful as battery <b>electrolytes</b>, displays, sensors, signal transduction materials, solid-phase capacitors, ion-exchange <b>membranes</b>, etc., comprise films made of compns. contg. sulfonated arom. polymers, vulcanized rubbers, and org. solvents. Thus, 90 parts 10% N-methylpyrrolidone soln. of sulfonated 4,4'-dichlorobenzophenone-2,5-dichloro-4-phenoxybenzophenone copolymer and 10 parts 10% N-methylpyrrolidone dispersion of acrylonitrile-butadiene-divinylbenzene-N-vinylpyrrolidone rubber particles were homogenized, cast on a glass sheet, and dried to give a film with sulfonic acid equiv 2.15 mequiv/g, proton cond. 2.36 .times. 10<sup>-3</sup> S/cm, tensile strength 64 MPa, and elongation at rupture 9%.</p>				
ST	sulfonated arom polymer vulcanized rubber blend film; proton conductor sulfonated arom polyketone rubber blend				
IT	<p>Synthetic rubber, uses            RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (acrylonitrile-butadiene-divinylbenzene-methacrylic acid; protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)</p>				
IT	<p>Synthetic rubber, uses            RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (acrylonitrile-butadiene-divinylbenzene-vinylpyrrolidone; protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)</p>				
IT	<p>Polyoxyarylenes            RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (polyketone-, sulfonated; protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)</p>				
IT	<p>Polyketones            RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (polyoxyarylene-, sulfonated; protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)</p>				
IT	<p>Ionic conductors            Plastic films            (protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)</p>				
IT	<p>Polyketones            RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (sulfonated; protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)</p>				
IT	<p><b>444889-37-6DP</b>, sulfonated    <b>444889-38-7DP</b>, sulfonated            RL: <b>IMF (Industrial manufacture)</b>; POF (Polymer in formulation); TEM (Technical or engineered material use); <b>PREP (Preparation)</b>; USES (Uses)            (protonic conductive films of sulfonated arom. polymer compns. contg. vulcanized rubbers)</p>				
IT	<p>55340-82-4P, Acrylonitrile-butadiene-divinylbenzene-methacrylic acid copolymer    444889-35-4P            RL: IMF (Industrial manufacture); MOA (Modifier or additive use); TEM</p>				

(Technical or engineered material use); PREP (Preparation); USES (Uses)  
(rubber; protonic conductive films of sulfonated arom. polymer compns.  
contg. vulcanized rubbers)

IT 444889-37-6DP, sulfonated

RL: IMF (Industrial manufacture); POF (Polymer in formulation);

TEM (Technical or engineered material use); PREP (Preparation);

USES (Uses)

(protonic conductive films of sulfonated arom. polymer compns. contg.  
vulcanized rubbers)

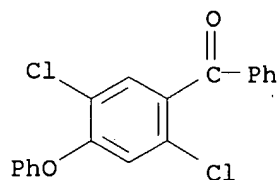
RN 444889-37-6 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichloro-4-phenoxyphenyl)phenylmethanone (9CI) (CA INDEX NAME)

CM 1

CRN 444889-36-5

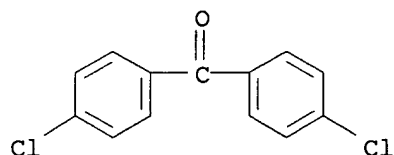
CMF C19 H12 C12 O2



CM 2

CRN 90-98-2

CMF C13 H8 C12 O



L16 ANSWER 14 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2002:571485 HCAPLUS

DN 137:143007

TI Polymer **electrolyte membrane** and solid polymer  
**electrolyte fuel cell**

IN Asano, Yoichi; Nanaumi, Masaaki; Kanaoka, Nagayuki; Sohma, Hiroshi; Saito, Nobuhiro; Matsuo, Junji; Goto, Kohei; Takahashi, Masayuki; Naito, Yuji; Masaka, Fusazumi

PA Honda Giken Kogyo K.K., Japan; JSR Corp.

SO Ger. Offen., 40 pp.

CODEN: GWXXBX

DT Patent

LA German

IC ICM H01M008-02

ICS B01D071-00

*applicant*

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 10201886	A1	20020801	DE 2002-10201886	20020118
	JP 2002216797	A2	20020802	JP 2001-12361	20010119
	JP 3412762	B2	20030603		
	JP 2002216798	A2	20020802	JP 2001-12362	20010119
	JP 3412763	B2	20030603		
	JP 2002216790	A2	20020802	JP 2001-12363	20010119
	JP 3411562	B2	20030603		
	JP 2002216799	A2	20020802	JP 2001-12489	20010119
	US 2002172850	A1	20021121	US 2002-51199	20020122
PRAI	JP 2001-12361	A	20010119		
	JP 2001-12362	A	20010119		
	JP 2001-12363	A	20010119		
	JP 2001-12489	A	20010119		

AB A polymer composite **electrolyte membrane** is formed from a first polymer **electrolyte** comprising a sulfonated polyarylene polymer and a second polymer **electrolyte** comprising an another hydrocarbon polymer **electrolyte**. The first polymer **electrolyte** consists of 2-70 mol% of an arom. compd. unit with an electron-attractive group in its main chain, while 30-98 mol% of it consist of an arom. compd. unit without electron-attractive group in the main chain. The second polymer **electrolyte** is a sulfonated polyether **electrolyte** or a sulfonated polysulfide **electrolyte**. The polymer composite **electrolyte membrane** is formed from a matrix, which covers the first polymer **electrolyte**, selected from sulfonated polyarylene polymers, and contains an ion exchange capacity of >1.5 meq/g, but <3.0 meq/g, which is carried on a reinforcement; the second polymer **electrolyte** has an ion exchange capacity of >0.5 meq/g, but <1.5 meq/g. The polymer **electrolyte membrane** covers a polyarylene polymer, which is so sulfonated that the Q-value lies within the range of 0.09-0.18 C/cm<sup>2</sup>.

ST **fuel cell polymer composite electrolyte membrane**

IT Polymers, uses

RL: DEV (Device component use); USES (Uses)  
 (arom., sulfonated; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)

IT Ion exchange

(capacity; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)

IT Silicates, uses

RL: MOA (Modifier or additive use); USES (Uses)  
 (phyllo-; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)

IT Polyketones

RL: DEV (Device component use); USES (Uses)  
 (polyether-, sulfonated; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)

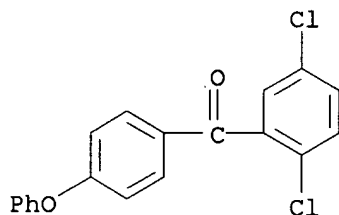
IT Polyethers, uses

RL: DEV (Device component use); USES (Uses)  
 (polyketone-, sulfonated; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)

- IT **Membranes, nonbiological**  
 Polymer **electrolytes**  
 Solid state **fuel cells**  
 (polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)
- IT Hydrocarbons, uses  
 RL: DEV (Device component use); USES (Uses)  
 (polymers, sulfonated; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)
- IT Polyethers, uses  
 Polyoxyphenylenes  
 Polysulfides  
 Polythiophenylenes  
 RL: DEV (Device component use); USES (Uses)  
 (sulfonated; polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)
- IT 7440-06-4, Platinum, uses  
 RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)  
 (polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)
- IT 151173-26-1P **364062-39-5P**  
 RL: DEV (Device component use); **SPN (Synthetic preparation);**  
**PREP (Preparation);** USES (Uses)  
 (polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)
- IT **364062-39-5P**  
 RL: DEV (Device component use); **SPN (Synthetic preparation);**  
**PREP (Preparation);** USES (Uses)  
 (polymer **electrolyte membrane** and solid polymer **electrolyte fuel cell**)
- RN 364062-39-5 HCAPLUS
- CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)(4-phenoxyphenyl)methanone (9CI) (CA INDEX NAME)

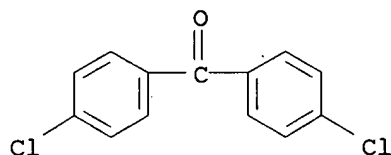
CM 1

CRN 151173-25-0  
 CMF C19 H12 Cl2 O2



CM 2

CRN 90-98-2  
 CMF C13 H8 Cl2 O



L16 ANSWER 15 OF 30 HCAPLUS COPYRIGHT 2003 ACS  
 AN 2002:281429 HCAPLUS  
 DN 137:79794  
 TI Proton exchange **membrane** nanocomposites  
 AU Hickner, Michael A.; Kim, YuSeung; Wang, Feng; McGrath, James E.;  
 Zawodzinski, Thomas A.  
 CS Department of Chemistry and Materials Research Institute, Virginia  
 Polytechnic Institute and State University, Blacksburg, VA, 24061, USA  
 SO Proceedings of the American Society for Composites, Technical Conference  
 (2001), 16th, 323-336  
 CODEN: PAMTEG; ISSN: 1084-7243  
 PB CRC Press LLC  
 DT Journal; (computer optical disk)  
 LA English  
 CC 38-3 (Plastics Fabrication and Uses)  
 Section cross-reference(s): 35, 37, 52  
 AB Polymeric **membrane** nanocomposites incorporating phosphotungstic  
 acid were synthesized as candidates for **fuel cell**  
 proton exchange **membranes**. The matrix polymers for the  
 nanocomposites were sulfonated poly(arylene ether sulfone)s. The main  
 goal of this research is to improve upon purely polymeric proton exchange  
**membranes** and allow the **fuel cell** to be run at  
 temps. greater than 100.degree.C. The phosphotungstic acid serves to  
 improve the protonic cond. of the **membrane** while decreasing the  
 water absorption. This is a surprising result, as with most sulfonic  
 acid-base **membranes**, protonic cond. has been directly related to  
**membrane** water content. In addn., the inorg. filler also improves  
 the modulus of the material.  
 ST sulfonated polyarylene polyether polysulfone polyelectrolyte  
 phosphotungstic acid nanocomposite **membrane**; protonic cond water  
 absorption modulus nanocomposite **membrane fuel**  
**cell**  
 IT **Membranes**, nonbiological  
 (composite; proton exchange **membrane** nanocomposites of  
 sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)  
 IT Sulfonation  
 (effect on properties of **membrane** nanocomposites of  
 sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)  
 IT Polyelectrolytes  
 (**membrane** nanocomposites of sulfonated poly(arylene ether  
 sulfone)s/phosphotungstic acid)  
 IT Phase separation  
 (micro-; in **membrane** nanocomposites of sulfonated  
 poly(arylene ether sulfone)s/phosphotungstic acid)  
 IT Polymer morphology  
 Storage modulus  
 Stress-strain relationship  
 (of **membrane** nanocomposites of sulfonated poly(arylene ether

- sulfone)s/phosphotungstic acid)
- IT **Fuel cell** separators  
(of nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)
- IT Polysulfones, uses  
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyether-, arom., sulfonated; proton exchange **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)
- IT Polysulfones, uses  
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyether-, arom.; proton exchange **membrane** nanocomposites of poly(arylene ether sulfone)s/phosphotungstic acid)
- IT Polyethers, uses  
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polysulfone-, arom., sulfonated; proton exchange **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)
- IT Polyethers, uses  
RL: POF (Polymer in formulation); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polysulfone-, arom.; proton exchange **membrane** nanocomposites of poly(arylene ether sulfone)s/phosphotungstic acid)
- IT Nanocomposites  
(proton exchange **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)
- IT Ionic conductivity  
(proton; of **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)
- IT 7732-18-5, Water, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(absorption; of **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)
- IT 80-07-9, 4,4'-Dichlorodiphenylsulfone  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(in sulfonation reaction to prep. monomer and in polymn.)
- IT 51698-33-0P  
RL: PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
(monomer; prepn. of and in synthesis of sulfonated poly(arylene ether sulfone)s)
- IT **25608-64-4P**, 4,4'-Biphenol-4,4'-Dichlorodiphenylsulfone copolymer  
**25839-81-0P**, 4,4'-Biphenol-4,4'-Dichlorodiphenylsulfone copolymer, sru  
RL: POF (Polymer in formulation); PRP (Properties); **SPN (Synthetic preparation)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
(proton exchange **membrane** nanocomposites of poly(arylene ether sulfone)s/phosphotungstic acid)
- IT 1343-93-7, Phosphotungstic acid 12067-99-1, Phosphotungstic acid  
RL: MOA (Modifier or additive use); USES (Uses)  
(proton exchange **membrane** nanocomposites of sulfonated

poly(arylene ether sulfone)s/phosphotungstic acid)  
 IT **267877-35-ODP**, hydrolyzed  
 RL: POF (Polymer in formulation); PRP (Properties); **SPN (Synthetic preparation)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)

(proton exchange **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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- (2) Malhotra, S; J Electrochem Soc 1997, V144(2), PL23 HCAPLUS
- (3) Park, M; Denki Kagaku 1996, V64, P743 HCAPLUS
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- (9) Zaidi, S; J Memb Sci 2000, V173, P17 HCAPLUS
- (10) Zawodzinski, T; J Phys Chem 1991, V95, P6040 HCAPLUS

IT **25608-64-4P**, 4,4'-Biphenol-4,4'-Dichlorodiphenylsulfone copolymer  
 RL: POF (Polymer in formulation); PRP (Properties); **SPN (Synthetic preparation)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)

(proton exchange **membrane** nanocomposites of poly(arylene ether sulfone)s/phosphotungstic acid)

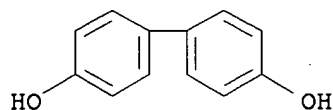
RN 25608-64-4 HCAPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

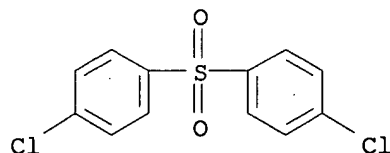
CMF C12 H10 O2



CM 2

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



IT 267877-35-0DP, hydrolyzed

RL: POF (Polymer in formulation); PRP (Properties); **SPN (Synthetic preparation)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)

(proton exchange **membrane** nanocomposites of sulfonated poly(arylene ether sulfone)s/phosphotungstic acid)

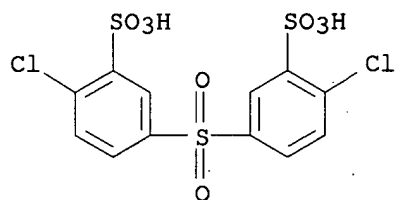
RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)  
(CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

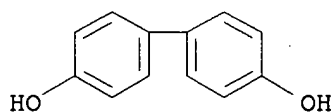


● 2 Na

CM 2

CRN 92-88-6

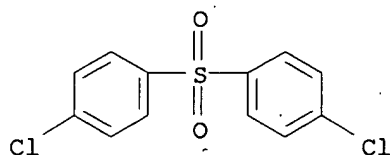
CMF C12 H10 O2



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



L16 ANSWER 16 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2002:241166 HCAPLUS

DN 136:265821

TI Ion-conducting sulfonated polymeric materials

IN McGrath, James E.; Hickner, Michael; Wang, Feng; Kim, Yu-Seung

PA Virginia Tech Intellectual Properties, Inc., USA

SO PCT Int. Appl., 46 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM H01M008-10

ICS C08G069-26; C08G075-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 37

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2002025764	A1	20020328	WO 2001-US29293	20010920
	W:				
	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,				
	CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,				
	GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,				
	LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL,				
	PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG,				
	UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW:				
	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY,				
	DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF,				
	BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	AU 2001092804	A5	20020402	AU 2001-92804	20010920
	US 2002091225	A1	20020711	US 2001-956256	20010920
PRAI	US 2000-234177P	P	20000920		
	US 2001-311350P	P	20010813		
	US 2001-311360P	P	20010813		
	WO 2001-US29293	W	20010920		
AB	Sulfonated polymers are made by the direct polymn. of a sulfonated monomer to form the sulfonated polymers. The types of sulfonated polymers may include polysulfones or polyimides. The sulfonated polymers can be formed into <b>membranes</b> that may be used in proton exchange <b>membrane fuel cells</b> or as ion exchange <b>membranes</b> . The <b>membranes</b> formed from the sulfonated polymers exhibit improved properties over that of Nafion. A heteropoly acid may be added to the sulfonated polymer to form a nanocomposite <b>membrane</b> in which the heteropoly acid is highly dispersed. The addn. of a heteropoly acid to the sulfonated polymer increases the thermal stability of the <b>membrane</b> , enhances the cond. above 100.degree., and reduces the water uptake of the <b>membrane</b> .				
ST	<b>fuel cell membrane</b> sulfonated polymer heteropoly acid nanocomposite; ion exchange <b>membrane</b> sulfonated polymer heteropoly acid nanocomposite				
IT	Ion exchange <b>membranes</b> (ion-conducting sulfonated polymeric materials)				
IT	Heteropoly acids RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses) (ion-conducting sulfonated polymeric materials)				
IT	<b>Fuel cells</b> (proton exchange <b>membrane</b> ; ion-conducting sulfonated polymeric materials)				

IT Polyimides, uses  
 Polysulfones, uses  
 RL: DEV (Device component use); SPN (Synthetic preparation); TEM  
 (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (sulfonated; ion-conducting sulfonated polymeric materials)

IT **267877-35-0P** 302924-87-4DP, proton exchanged derivs.  
 302924-87-4P  
 RL: DEV (Device component use); **SPN (Synthetic preparation)**; TEM  
 (Technical or engineered material use); **PREP (Preparation)**; USES  
 (Uses)  
 (ion-conducting sulfonated polymeric materials)

IT 11104-88-4, Phosphomolybdic acid 12067-99-1, Phosphotungstic acid  
 13772-29-7  
 RL: DEV (Device component use); TEM (Technical or engineered material  
 use); USES (Uses)  
 (ion-conducting sulfonated polymeric materials)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE  
 (1) Aisin Aw Co Ltd; JP 09245818 1997 HCAPLUS  
 (2) Mecham, J; Polym Prepr 2000, V41(2), P1388 HCAPLUS  
 (3) Miller; US 5272217 A 1993 HCAPLUS

IT **267877-35-0P**  
 RL: DEV (Device component use); **SPN (Synthetic preparation)**; TEM  
 (Technical or engineered material use); **PREP (Preparation)**; USES  
 (Uses)  
 (ion-conducting sulfonated polymeric materials)

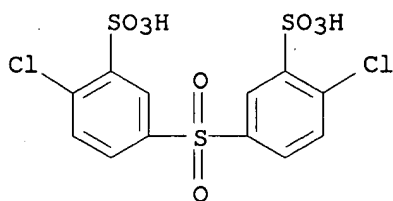
RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer  
 with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)  
 (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

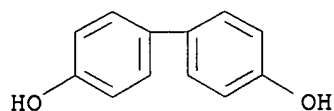


● 2 Na

CM 2

CRN 92-88-6

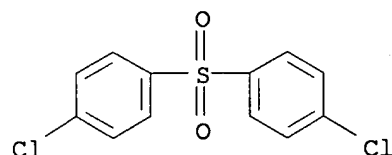
CMF C12 H10 O2



CM 3

CRN 80-07-9

CMF C12 H8 C12 O2 S



L16 ANSWER 17 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2002:93463 HCAPLUS

DN 136:310780

TI Direct polymerization of sulfonated poly(arylene ether sulfone) random (statistical) copolymers: candidates for new proton exchange

**membranes**

AU Wang, Feng; Hickner, Michael; Kim, Yu Seung; Zawodzinski, Thomas A.; McGrath, James E.

CS Department of Chemistry and Materials Research Institute, Virginia Polytechnic Institute and State University, Blacksburg, VA, 24061, USA

SO Journal of Membrane Science (2002), 197(1-2), 231-242

CODEN: JMESDO; ISSN: 0376-7388

PB Elsevier Science B.V.

DT Journal

LA English

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 35

AB Novel biphenol-based wholly arom. poly(arylene ether sulfone)s contg. up to two pendant sulfonate groups per repeat unit were prep'd. by potassium carbonate mediated direct arom. nucleophilic substitution polycondensation of disodium 3,3'-disulfonate-4,4'-dichlorodiphenylsulfone (SDCDPS), 4,4'-dichlorodiphenylsulfone (DCDPS) and 4,4'-biphenol. Copolymn. proceeded quant. to high mol. wt. in N-methyl-2-pyrrolidinone at 190 .degree.C. Tough **membranes** with a SDCDPS/DCDPS mole ratio up to 60:40 were successfully cast using N,N-dimethylacetamide. An increase of sulfonate groups in the copolymer resulted in increased glass transition temp., enhanced **membrane** hydrophilicity, and intrinsic viscosity; the 100% SDCDPS homopolymer was water sol. The acid form **membranes** were successfully obtained by treating the sodium form of the **membranes** with dil. sulfuric acid soln. Thermogravimetric anal. shows that the sodium form materials have enhanced thermal stability relative to the acid form, as expected. At. force microscopy (AFM) phase images of the acid form **membranes** clearly show the hydrophilic domains, with sizes increasing from 10 to 25 nm as a function of the degree of sulfonation. A phase inversion could be obsd.

for the 60% SCDPS copolymer, which was consistent with a rapid increase in water absorption. Short-term aging (30 min) indicates that the desired acid form **membranes** are stable to 220 .degree.C in air and cond. values at 30 .degree.C of 0.11 S/cm (SDCDPS/DCDPS=0.4) and 0.17 S/cm (SDCDPS/DCDPS=0.6) were measured, which are comparable to or higher than the state-of-the-art fluorinated copolymer Nafion 1135 control (0.12 S/cm). The cond. is greatly influenced by ion exchange capacity, temp., and water activity. The new copolymers, which contain ion cond. sites on the deactivated positions of the aryl backbone rings, are candidates as new polymeric **electrolyte** materials for proton exchange **membrane (PEM) fuel cells**.

- ST nucleophilic substitution polycondensation disodium disulfonatodichlorodiphenylsulfone dichlorodiphenylsulfone biphenol potassium carbonate; polyether polysulfone **membrane** prepn
- IT Electric conductivity  
Glass transition temperature  
**Membranes**, nonbiological  
Thermal stability  
Viscosity  
(prepn., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange **membranes**)
- IT Adsorption  
(water; prepn., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange **membranes**)
- IT 584-08-7, Potassium carbonate  
RL: CAT (Catalyst use); USES (Uses)  
(prepn., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange **membranes**)
- IT **267877-35-0P**  
RL: PRP (Properties); RCT (Reactant); **SPN (Synthetic preparation)**  
; TEM (Technical or engineered material use); **PREP (Preparation)**  
; RACT (Reactant or reagent); USES (Uses)  
(prepn., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange **membranes**)
- IT **267877-35-0DP**, hydrolyzed  
RL: PRP (Properties); **SPN (Synthetic preparation)**; TEM  
(Technical or engineered material use); **PREP (Preparation)**; USES  
(Uses)  
(prepn., thermal, elec., and rheolog. properties of sulfonated poly(arylene ether sulfone) as candidates for new proton exchange **membranes**)

RE.CNT 37 THERE ARE 37 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE

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IT 267877-35-0P

RL: PRP (Properties); RCT (Reactant); **SPN (Synthetic preparation)**  
 ; TEM (Technical or engineered material use); **PREP (Preparation)**  
 ; RACT (Reactant or reagent); USES (Uses)  
 (prepn., thermal, elec., and rhelog. properties of sulfonated  
 poly(arylene ether sulfone) as candidates for new proton exchange  
**membranes)**

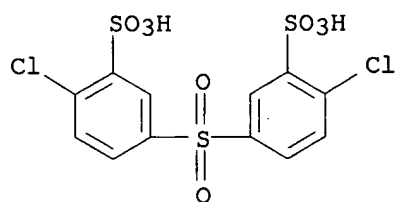
RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer  
 with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)  
 (CA INDEX NAME)

CM 1

CRN 51698-33-0

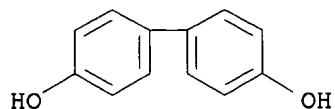
CMF C12 H8 Cl2 O8 S3 . 2 Na



● 2 Na

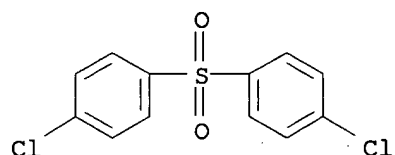
CM 2

CRN 92-88-6  
CMF C12 H10 O2



CM 3

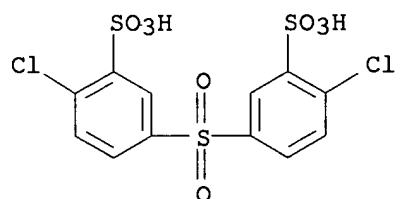
CRN 80-07-9  
CMF C12 H8 C12 O2 S



IT 267877-35-0DP, hydrolyzed  
RL: PRP (Properties); SPN (Synthetic preparation); TEM  
(Technical or engineered material use); PREP (Preparation); USES  
(Uses)  
(prepn., thermal, elec., and rheolog. properties of sulfonated  
poly(arylene ether sulfone) as candidates for new proton exchange  
membranes)  
RN 267877-35-0 HCAPLUS  
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer  
with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)  
(CA INDEX NAME)

CM 1

CRN 51698-33-0  
CMF C12 H8 C12 O8 S3 . 2 Na

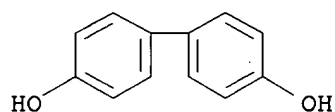


● 2 Na

CM 2

CRN 92-88-6

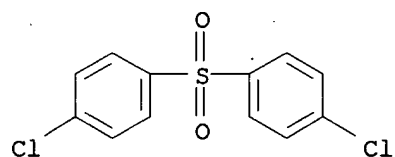
CMF C12 H10 O2



CM 3

CRN 80-07-9

CMF C12 H8 C12 O2 S



L16 ANSWER 18 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:846076 HCAPLUS

DN 136:102739

TI Synthesis of highly sulfonated poly(arylene ether sulfone) random (statistical) copolymers via direct polymerization

AU Wang, Feng; Hickner, Michael; Ji, Qing; Harrison, William; Mecham, Jeffrey; Zawodzinski, Thomas A.; McGrath, James E.

CS Department of Chemistry and Materials Research Institute (0344), Virginia Polytechnic Institute and State University, Blacksburg, VA, 24061, USA

SO Macromolecular Symposia (2001), 175(Polymerization Processes and Polymer Materials II), 387-395

CODEN: MSYMEC; ISSN: 1022-1360

PB Wiley-VCH Verlag GmbH

DT Journal

- LA English
- CC 35-5 (Chemistry of Synthetic High Polymers)
- AB Novel biphenol-based wholly arom. poly (arylene ether sulfones) contg. pendant sulfonate groups were prep'd. by direct arom. nucleophilic substitution polycondensation of disodium 3,3'-disulfonate-4,4'-dichlorodiphenyl sulfone (SDCDPS), 4,4'-dichlorodiphenylsulfone (DCDPS) and biphenol. Copolymn. proceeded quant. to high mol. wt. in N-methyl-2-pyrrolidinone at 190.degree.C in the presence of anhyd. potassium carbonate. Tough **membranes** were successfully cast from the control and the copolymers, which had a SDCDPS/DCDPS mole ratio of either 40:60 or 60:40 using N,N-dimethylactamide; the 100% SDCDPS homopolymer was water sol. Short-term aging (30 min) indicates that the desired acid form **membranes** are stable to 220.degree.C in air and cond. values at 25.degree.C of 0.110 (40%) and 0.170 S/cm (60%) were measured, which are comparable to or higher than the state-of-the art fluorinated copolymer Nafion 1135 control. The new copolymers, which contain ion cond. sites on deactivated rings, are candidates as new polymeric **electrolyte** materials for proton exchange **membrane** (PEM) **fuel cells**. Further research comparing their **membrane** behavior to post-sulfonated systems is in progress.
- ST sulfonated polyarylene ether
- IT Polysulfones, preparation  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (polyether-, arom.; synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
- IT Polyethers, preparation  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation) (polysulfone-, arom.; synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
- IT Electric conductivity  
Viscosity  
(synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
- IT 267877-35-ODP, reaction products with acids 389600-31-1DP  
, reaction products with acids  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
- IT 80-07-9  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
- IT 51698-33-0P 57570-28-2P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(synthesis of highly sulfonated poly(arylene ether sulfone) via direct polymn.)
- RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD
- RE
- (1) Anon; Macromolecules in preparation
  - (2) Applby, A; Sci American 1999
  - (3) Dinno, M; Physicochemical Aspects of Polymer Surfaces 1983, V1, P347 HCAPLUS
  - (4) Dumais, J; Macromolecules 1986, V19, P1884 HCAPLUS
  - (5) Gunduz, N; Polymer Preprints 2000, V41(2), P1565 HCAPLUS
  - (6) Jacoby, M; C&E News 1999, V77, P31

- (7) Johnson, B; J of Polym Sci 1984, V22, P721 HCAPLUS
- (8) Kopitzke, R; Journal of The Electrochemical Society 2000, V147(5), P1677 HCAPLUS
- (9) Lloyd, D; ACS Symposium Series 1981, 153, P327
- (10) McGrath, J; ACS Symposium 1999
- (11) Mercier, R; Fifth European Technical Symposium on Polyimides and High Performance Functional Polymers 1999
- (12) Noshay, A; J of Appl Polym Sci 1976, V20, P1885 HCAPLUS
- (13) Robeson, L; US 4380598 1983 HCAPLUS
- (14) Robeson, L; Molecular Basis for Transitions and Relaxations 1978, V4, P405 HCAPLUS
- (15) Shobha, H; Polymer Preprints 2000, V40(1), P180
- (16) Springer, T; Journal of The Electrochemical Society 1991, V138(8), P2334 HCAPLUS
- (17) Tran, C; Thesis Virginia Polytechnic Institute and State University 1980
- (18) Udea, M; J Polym Sci, Polym Chem Ed 1993, V31, P85
- (19) Wang, F; Polymer Preprints 2000, V40(2), P180
- (20) Wang, F; Polymer Preprints 2000, V40(1), P237

IT 267877-35-ODP, reaction products with acids 389600-31-1DP\*\*\*,  
reaction products with acids

RL: PRP (Properties); \*\*\*SPN (Synthetic preparation); PREP  
(Preparation)

(synthesis of highly sulfonated poly(arylene ether sulfone) via direct  
polymn.)

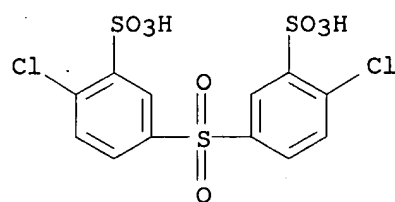
RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer  
with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)  
(CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

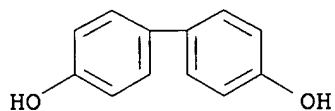


● 2 Na

CM 2

CRN 92-88-6

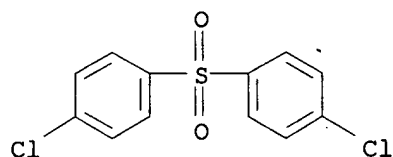
CMF C12 H10 O2



CM 3

CRN 80-07-9

CMF C12 H8 C12 O2 S



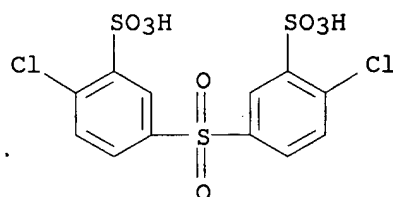
RN 389600-31-1 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol (9CI) (CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 C12 O8 S3 . 2 Na

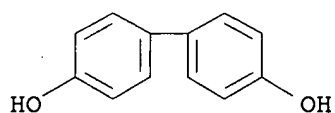


● 2 Na

CM 2

CRN 92-88-6

CMF C12 H10 O2



L16 ANSWER 19 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:814335 HCAPLUS

DN 135:360183

TI Manufacture of ion exchanging filters for polymer **electrolyte fuel cells** and the **fuel cells**

IN Terada, Ichiro

PA Asahi Glass Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-06

ICS B01D069-02; B01D071-26; B01D071-32; C08J005-22; C08J007-00;  
C08J007-04; D06M010-00; D06M010-02; D06M011-52; D06M014-10;  
D06M014-12; H01M008-10; C08L081-06

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001313057	A2	20011109	JP 2000-127406	20000427
PRAI	JP 2000-127406		20000427		

AB The filters, for purifying H and O supplied to polymer **electrolyte fuel cells**, are prepd. by treating polyolefin or polyfluoroolefin substrates to form hydrophilic surface, applying an ion exchanger polymer soln. on the treated substrate, and drying. The **fuel cells** are manufd. by using the above method to prep. reaction gas purifying filters.

ST polymer **electrolyte fuel cell** ion exchanging filter manuf; **fuel cell** reaction gas ion. exchanging filter

IT Filters

**Fuel cells**

Ion exchangers

(manuf. of ion exchanger coated hydrophilic polymer filters for polymer **electrolyte fuel cell** reaction gas purifn.)

IT 25154-01-2P

RL: IMF (Industrial manufacture); PREP (Preparation)

(manuf. of ion exchanger coated hydrophilic polymer filters for polymer **electrolyte fuel cell** reaction gas purifn.)

IT 25135-51-7DP, Udel p 1700, chloromethylated, reaction products with trimethylamine 25135-51-7DP, sulfonated **25154-01-2DP**, chloromethylated, reaction products with trimethylamine 26654-97-7DP, sulfonated

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(manuf. of ion exchanger coated hydrophilic polymer filters for polymer **electrolyte fuel cell** reaction gas purifn.)

IT 25154-01-2P

RL: IMF (Industrial manufacture); PREP (Preparation)

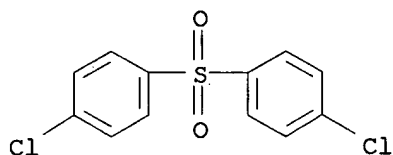
(manuf. of ion exchanger coated hydrophilic polymer filters for polymer **electrolyte fuel cell** reaction gas purifn.)

RN 25154-01-2 HCAPLUS

CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

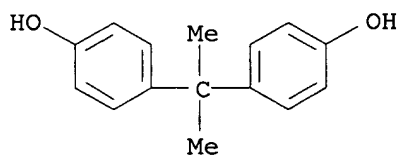
CM 1

CRN 80-07-9  
CMF C12 H8 Cl2 O2 S



CM 2

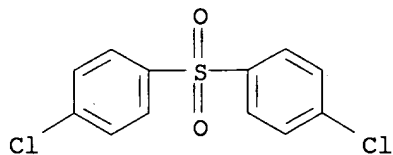
CRN 80-05-7  
CMF C15 H16 O2



IT **25154-01-2DP**, chloromethylated, reaction products with trimethylamine  
RL: **IMF (Industrial manufacture)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
(manuf. of ion exchanger coated hydrophilic polymer filters for polymer electrolyte fuel cell reaction gas purifn.)  
RN 25154-01-2 HCAPLUS  
CN Phenol, 4,4'-(1-methylethylidene)bis-, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

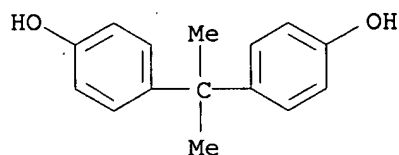
CM 1

CRN 80-07-9  
CMF C12 H8 Cl2 O2 S



CM 2

CRN 80-05-7  
CMF C15 H16 O2



L16 ANSWER 20 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:760440 HCAPLUS

DN 135:304937

TI Preparation of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**

IN Takahashi, Masayuki; Goto, Kohei; Igarashi, Katsutoshi

PA JSR Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 14 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01B013-00

ICS C08G061-10; C08G061-12; C08J005-18; C08J007-00; H01B001-06; H01B001-12; H01G009-028; H01M006-18; H01M008-10; H01M010-40; C08L065-00

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001291443	A2	20011019	JP 2000-102976	20000405
PRAI	JP 2000-102976		20000405		

AB Title **membranes** with high H<sup>+</sup> cond. at wide temp. region, suitable for battery **electrolytes**, solid polymeric **electrolytes**, fuel cells, display devices, sensors, capacitors, solid condensers, ion-exchange **membranes**, etc. (no data), are prepd. by irradiating of sulfonated polyarylene films with electron beam. Thus, a sulfonated poly[(4-phenoxybenzoyl)-1,4-phenylene] was dissolved in DMF, coated on a glass plate, and irradiated with electronic beam 60 Mrad to give a film with H<sup>+</sup> cond. at 80.degree. 4.2 x 10<sup>-2</sup> S/cm<sup>2</sup> and exhibiting good strength, durability, and swelling resistance in water at 90.degree..

ST sulfonated polyarylene curable proton conductive **membrane**

IT **Membranes**, nonbiological

(elec. conductive, proton conductive; prepn. of curable polyarylenes bearing sulfuric acid for proton-conductive **membranes**)

IT Electron beams

(irradn.; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT Polyphenyls

RL: DEV (Device component use); IMF (Industrial manufacture); PRP (Properties); PREP (Preparation); USES (Uses)

(polyketone-, sulfonated; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT Ionic conductors

(polymeric; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT Polyketones

RL: DEV (Device component use); IMF (Industrial manufacture); PRP

(Properties); PREP (Preparation); USES (Uses)  
 (polyphenyl-, sulfonated; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT Ionic conductivity  
 (proton; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT Polyphenyls  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (sulfonated; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT 154100-93-3P, Poly[(4-phenoxybenzoyl)-1,4-phenylene]  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (intermediate; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT 151173-26-1P, 2,5-Dichloro-4'-phenoxybenzophenone homopolymer  
 349452-18-2P **364062-39-5P** 366801-18-5P  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
 (intermediate; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT 151173-25-0P, 2,5-Dichloro-4'-phenoxybenzophenone  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
 (monomer; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT 151173-26-1DP, 2,5-Dichloro-4'-phenoxybenzophenone homopolymer, sulfonated  
 154100-93-3DP, Poly[(4-phenoxy)benzoyl)-1,4-phenylene], sulfonated  
 349452-18-2DP, sulfonated **364062-39-5DP**, sulfonated  
 366801-18-5DP, sulfonated  
 RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT 50-79-3, 2,5-Dichlorobenzoic acid 101-84-8, Diphenyl ether  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (starting material; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

IT **364062-39-5P**  
 RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)  
 (intermediate; prepn. of curable polyarylenes bearing sulfonic acid for proton-conductive **membranes**)

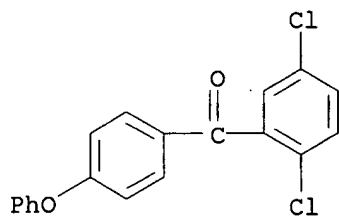
RN 364062-39-5 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)(4-phenoxyphenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 151173-25-0

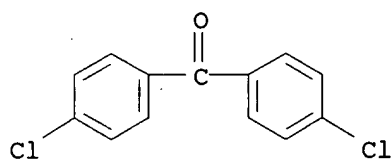
CMF C19 H12 C12 O2



CM 2

CRN 90-98-2

CMF C13 H8 Cl2 O



IT 364062-39-5DP, sulfonated

RL: IMF (Industrial manufacture); PRP (Properties); TEM  
(Technical or engineered material use); PREP (Preparation); USES  
(Uses)

(prepn. of curable polyarylenes bearing sulfonic acid for  
proton-conductive membranes)

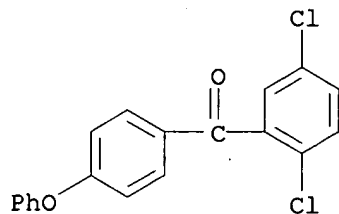
RN 364062-39-5 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)(4-phenoxyphenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 151173-25-0

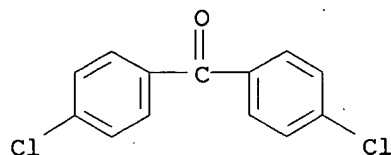
CMF C19 H12 Cl2 O2



CM 2

CRN 90-98-2

CMF C13 H8 Cl2 O



L16 ANSWER 21 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:713745 HCAPLUS

DN 135:259851

TI Ion exchange material for use in **membrane** electrode assembly of a **fuel cell**

IN Andrews, Mark James; Bridges, Richard Frank; Charnock, Peter; Devine, John Neil; Kemmish, David John; Lockley, John Edward; Wilson, Brian

PA Victrex Manufacturing Limited, UK

SO PCT Int. Appl., 71 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001071839	A2	20010927	WO 2001-GB1253	20010321
	WO 2001071839	A3	20020321		
	W:				
	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW:				
	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	EP 1275164	A2	20030115	EP 2001-917216	20010321
	R:				
	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
PRAI	GB 2000-6877	A	20000322		
	GB 2000-31207	A	20001221		
	WO 2001-GB1253	W	20010321		
AB	A method of prepg. an ion-conducting material, for example <b>membrane</b> , having reduced sensitivity to water includes a step of treating an ion-conducting polymeric material (esp. a sulfonated polyaryletherketone and/or sulfone) which has at least some crystallinity or which is crystallizable with a means to increase its crystallinity. The ion-conducting material prepd. may be used in a <b>membrane</b> electrode assembly of a <b>fuel cell</b> .				
ST	<b>fuel cell</b> ion exchange <b>membrane</b> ; polymer				
	<b>electrolyte membrane fuel cell</b>				
IT	Solvents				
	(aprotic; ion exchange material for use in <b>membrane</b> electrode assembly of <b>fuel cell</b> )				
IT	Catalysts				

(electrocatalysts; ion exchange material for use in **membrane electrode assembly of fuel cell**)

IT Conducting polymers  
Crystallinity  
**Fuel cells**  
**Membranes**, nonbiological  
(ion exchange material for use in **membrane electrode assembly of fuel cell**)

IT Polyketones  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(polyether-, sulfonated; ion exchange material for use in **membrane electrode assembly of fuel cell**)

IT Polyethers, uses  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(polyketone-, sulfonated; ion exchange material for use in **membrane electrode assembly of fuel cell**)

IT Polymers, uses  
RL: DEV (Device component use); USES (Uses)  
(sulfonated; ion exchange material for use in **membrane electrode assembly of fuel cell**)

IT 361482-41-9 361482-41-9D, sulfonated  
RL: DEV (Device component use); USES (Uses)  
(ion exchange material for use in **membrane electrode assembly of fuel cell**)

IT 128324-23-2DP, sulfonated 128324-23-2P **362518-55-6P**  
**362518-56-7DP**, sulfonated **362518-56-7P** 362518-57-8P  
RL: DEV (Device component use); **SPN (Synthetic preparation);**  
**PREP (Preparation);** USES (Uses)  
(ion exchange material for use in **membrane electrode assembly of fuel cell**)

IT 7664-93-9, Sulfuric acid, reactions 31694-16-3, Victrex PEEK 450P  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(ion exchange material for use in **membrane electrode assembly of fuel cell**)

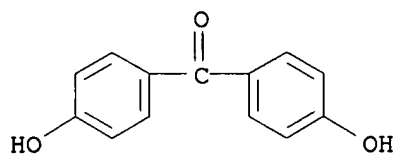
IT **362518-55-6P 362518-56-7DP**, sulfonated  
**362518-56-7P**  
RL: DEV (Device component use); **SPN (Synthetic preparation);**  
**PREP (Preparation);** USES (Uses)  
(ion exchange material for use in **membrane electrode assembly of fuel cell**)

RN 362518-55-6 HCAPLUS

CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol, bis(4-hydroxyphenyl)methanone and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)  
(CA INDEX NAME)

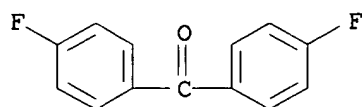
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CRN 611-99-4  
CMF C13 H10 O3



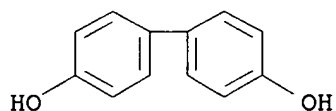
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CRN 345-92-6  
CMF C13 H8 F2 O



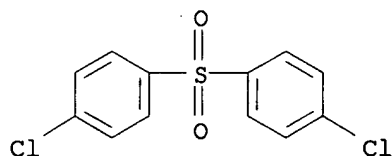
CM 3

CRN 92-88-6  
CMF C12 H10 O2



CM 4

CRN 80-07-9  
CMF C12 H8 Cl2 O2 S

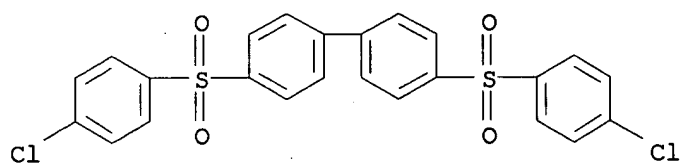


RN 362518-56-7 HCAPLUS  
CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol,  
4,4'-bis[(4-chlorophenyl)sulfonyl]-1,1'-biphenyl, bis(4-  
hydroxyphenyl)methanone and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA  
INDEX NAME)

CM 1

CRN 22287-56-5

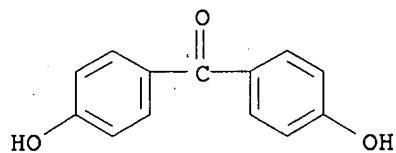
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CM 2

CRN 611-99-4

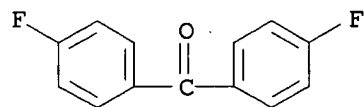
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CM 3

CRN 345-92-6

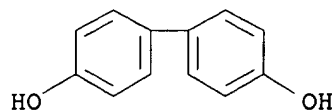
CMF C13 H8 F2 O



CM 4

CRN 92-88-6

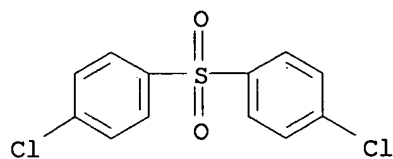
CMF C12 H10 O2



CM 5

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



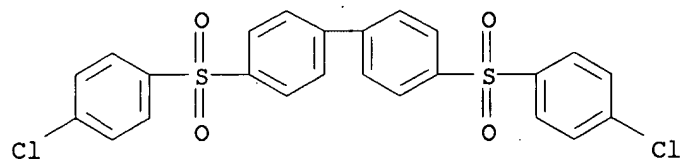
RN 362518-56-7 HCAPLUS

CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-4,4'-diol,  
4,4'-bis[(4-chlorophenyl)sulfonyl]-1,1'-biphenyl, bis(4-  
hydroxyphenyl)methanone and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA  
INDEX NAME)

CM 1

CRN 22287-56-5

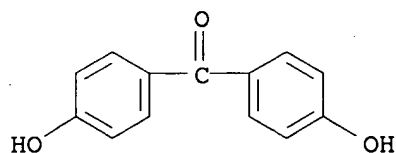
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CM 2

CRN 611-99-4

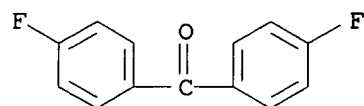
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CM 3

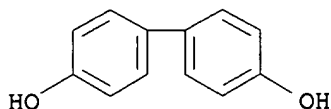
CRN 345-92-6

CMF C13 H8 F2 O



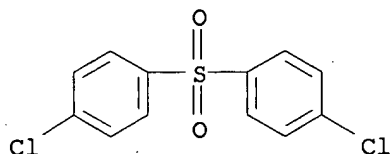
CM 4

CRN 92-88-6  
CMF C12 H10 O2



CM 5

CRN 80-07-9  
CMF C12 H8 C12 O2 S



L16 ANSWER 22 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:713457 HCAPLUS

DN 135:243473

TI Preparation of ion conducting polymers and composite **electrolyte membrane** therefrom

IN Charnock, Peter; Wilson, Brian; Bridges, Richard Frank

PA Victrex Manufacturing Limited, UK

SO PCT Int. Appl., 63 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM C08J005-22

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 35, 76

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001070858	A2	20010927	WO 2001-GB1243	20010321
WO 2001070858	A3	20011227		
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
EP 1268619	A2	20030102	EP 2001-914017	20010321
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
PRAI GB 2000-6883	A	20000322		

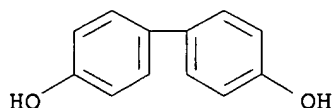
GB 2000-31209 A 20001221  
 WO 2001-GB1243 W 20010321

- AB A composite material, for example a composite **membrane** for a polymer **electrolyte membrane fuel cell** includes a first conductive polymer and a support material for the polymer, wherein the support material comprises a second conductive polymer. A method making of the composite material is also disclosed as is its use as a polymer **electrolyte membrane** in a **fuel cell**. Thus, a microporous ion conducting **membrane** prep'd. by casting a soln. contg. a 1:1 blend of polyetherketone and a sulfonated copolymer of 4,4'-difluorobenzophenone, 4,4'-dihydroxybenzophenone, and 4,4'-dihydroxybiphenyl was impregnated with a 15% soln. of a sulfonated copolymer of 4,4'-difluorobenzophenone, 4,4'-dihydroxybiphenyl, and 4,4'-dihydroxydiphenylsulfone and the composite **membrane** was strong and flexible.
- ST sulfonated polymer ion conducting **membrane** prepn; **fuel cell membrane** polymer **electrolyte** ion conducting
- IT **Membranes**, nonbiological  
 (composite, microporous; prepn. of ion conducting polymers for composite **electrolyte membrane**)
- IT Polyketones  
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-, arom., sulfonated, reaction products; prepn. of ion conducting polymers for composite **electrolyte membrane**)
- IT Polysulfones, uses  
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyether-, sulfonated; prepn. of ion conducting polymers for composite **electrolyte membrane**)
- IT Polyethers, uses  
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polyketone-, arom., sulfonated, reaction products; prepn. of ion conducting polymers for composite **electrolyte membrane**)
- IT Ionomers  
 RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (polyoxyalkylenes, fluorine- and sulfo-contg.; in prepn. of ion conducting polymers for composite **electrolyte membrane**)
- IT Polyethers, uses  
 RL: IMF (Industrial manufacture); POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (polysulfone-, sulfonated; prepn. of ion conducting polymers for composite **electrolyte membrane**)
- IT Conducting polymers  
 Polymer **electrolytes**  
 (prepn. of ion conducting polymers for composite **electrolyte membrane**)

- IT Polymer blends  
 RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (prepn. of ion conducting polymers for composite **electrolyte membrane**)
- IT **Fuel cells**  
 (prepn. of ion conducting polymers for composite **electrolyte membrane in fuel cell**)
- IT 71957-60-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-hydroquinone copolymer, sulfonated **83094-08-ODP**, 4,4'-Dichlorodiphenylsulfone 4,4'-dihydroxybiphenyl 4,4'-dihydroxydiphenylsulfone copolymer, sulfonated 128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer, sulfonated 128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated  
 RL: **IMF (Industrial manufacture)**; POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
 (prepn. of ion conducting polymers for composite **electrolyte membrane**)
- IT 27380-27-4  
 RL: POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); USES (Uses)  
 (prepn. of ion conducting polymers for composite **electrolyte membrane**)
- IT **83094-08-ODP**, 4,4'-Dichlorodiphenylsulfone 4,4'-dihydroxybiphenyl 4,4'-dihydroxydiphenylsulfone copolymer, sulfonated  
 RL: **IMF (Industrial manufacture)**; POF (Polymer in formulation); PRP (Properties); TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
 (prepn. of ion conducting polymers for composite **electrolyte membrane**)
- RN 83094-08-0 HCAPLUS
- CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

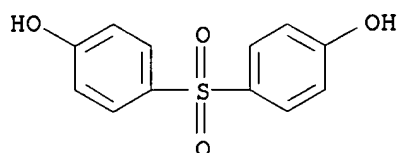
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CRN 92-88-6  
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CM 2

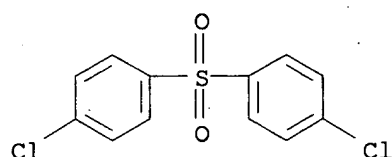
CRN 80-09-1  
 CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 C12 O2 S



L16 ANSWER 23 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:585306 HCAPLUS

DN 135:360132

TI Heteropolyacid/sulfonated poly(arylene ether sulfone) composites for proton exchange **membranes fuel cells**

AU Kim, Yu Seung; Wang, Feng; Hickner, Michael; Zawodzinski, Tom A.; McGrath, James E.

CS Department of Chemistry and Material Research Institute, Virginia Polytechnic Institute and State University, Blacksburg, VA, 24061, USA

SO Polymeric Materials Science and Engineering (2001), 85, 520-521

CODEN: PMSEDG; ISSN: 0743-0515

PB American Chemical Society

DT Journal

LA English

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 35

AB The prepn. of composite **membranes** for use as proton exchange **membranes in fuel cells** at high temps.

involves the incorporation of the solid heteropolyacid (hpa), H3PW12O40, in a poly(arylene ether sulfone) contg. pendant sulfo groups. The poly(arylene ether sulfone) is prepd. by reacting 4,4'-dichlorodiphenyl sulfone, 3,3'-disodioisulfo-4,4'-dichlorodiphenyl sulfone and 4,4'-biphenol. The HPA extn. behavior, morphol., thermal and mech. properties, and proton conduction at elevated temp. of the composite **membrane** are discussed.

ST heteropolyacid sulfonated polyarylene ether sulfone composite

**membrane; fuel cell membrane hpa**

sulfonated polyarylene ether sulfone composite

IT **Membranes**, nonbiological

(composite; proton exchange **membranes** from hpa and sulfonated poly(arylene ether sulfone) for **fuel cells**)

IT Polysulfones, uses

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polyether-, composites, **membranes**; proton exchange **membranes** from hpa and sulfonated poly(arylene ether sulfone) for **fuel cells**)

IT Polyethers, uses

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(polysulfone-, composites, **membranes**; proton exchange **membranes** from hpa and sulfonated poly(arylene ether sulfone) for **fuel cells**)

IT **Fuel cells**

(proton exchange **membranes** from hpa and sulfonated poly(arylene ether sulfone) for **fuel cells**)

IT 267877-35-ODP, hydrolyzed

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(composites, **membranes**; proton exchange **membranes** from hpa and sulfonated poly(arylene ether sulfone) for **fuel cells**)

IT 1343-93-7, Phosphotungstic acid (H3PW12O40)

RL: TEM (Technical or engineered material use); USES (Uses)

(composites, **membranes**; proton exchange **membranes** from hpa and sulfonated poly(arylene ether sulfone) for **fuel cells**)

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE

- (1) Johnson, B; J Polym Sci 1984, V22, P721 HCAPLUS
- (2) McGrath, J; ACS Symposium 1999
- (3) Nolte, R; J Memb Sci 1993, P83
- (4) Savadogo, O; J New Mater Electrochem Syst 1998, V1, P66
- (5) Wang, F; Macromot Symp in press 2001
- (6) Wang, F; Polymer Preprints 2000, V41(1), P237 HCAPLUS
- (7) Wang, F; Submitted for publication 2001
- (8) Zaidi, S; J Memb Sci 2000, V173, P17 HCAPLUS

IT 267877-35-ODP, hydrolyzed

RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(composites, **membranes**; proton exchange **membranes** from hpa and sulfonated poly(arylene ether sulfone) for **fuel cells**)

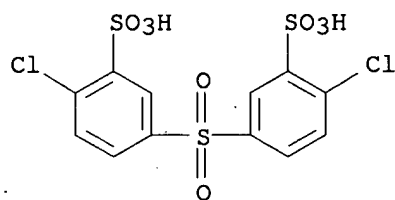
RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)  
(CA INDEX NAME)

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CRN 51698-33-0

CMF C12 H8 C12 O8 S3 . 2 Na

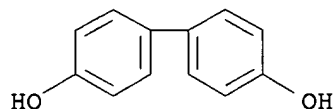


● 2 Na

CM 2

CRN 92-88-6

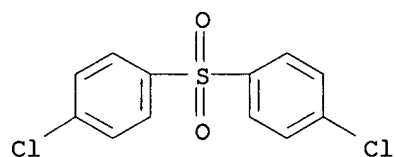
CMF C12 H10 O2



CM 3

CRN 80-07-9

CMF C12 H8 C12 O2 S



L16 ANSWER 24 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:519183 HCAPLUS

DN 135:93703

TI Film-formable polymers bearing sulfonic acid groups, and their proton-conductive films

IN Goto, Kohei; Takahashi, Masayuki; Yamakawa, Yoshitaka; Kakuta, Mayumi; Kawabe, Kenichi; Rojanski, Egori

PA Jsr Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 14 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C08L061-00

ICS G01N027-333; H01B001-06; H01G009-028; H01M006-18; H01M008-02; H01M010-40

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 37

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001192531	A2	20010717	JP 2000-1062	20000106
PRAI	JP 2000-1062		20000106		

AB The polymers with high H<sup>+</sup> cond. at wide temp. region, suitable for battery **electrolytes**, display devices, sensors, capacitors, ion-exchange **membranes**, etc., are prep'd. by sulfonating polymers contg.

.gtoreq.50 mol% of repeating units C6R1R2R3R4XC6R5R6R7R8 m-C6R9R10R11R12, and/or o-C6R9R10R11R12 (X = CYY'; Y, Y' = H, alkyl, halogenated alkyl, aryl, fluorenylene; R1-8 = H, SO3H, halo, alkyl, halogenated alkyl, allyl, aryl; R9-12 = H, SO3H, halo, alkyl, halogenated alkyl, aryl, functional monovalent org. group). Thus, 2, 4-dichloro-4'-phenoxybenzophenone was prep'd. and reacted to give poly(4'-phenoxy-2,4-benzophenone), which was reacted with H2SO4 to give a sulfonated polymer showing H<sup>+</sup> cond. at 20.degree. and 80.degree. 3.1 .times. 10<sup>-2</sup> and 1.5 .times. 10<sup>-2</sup> S/cm<sup>2</sup>, resp., and good swelling resistance in water at 80.degree..

ST sulfonated polymer manuf proton conductive film;  
dichlorophenoxybenzophenone polymer sulfonated proton conductive film;  
polyphenoxybenzophenone sulfonated proton conductive film

IT Ionic conductors

Plastic films

(polymers bearing sulfonic acid groups for forming proton-conductive films)

IT 339078-27-2DP, sulfonated 349452-15-9DP, sulfonated  
**349452-16-ODP**, sulfonated 349452-17-1DP, sulfonated  
349452-18-2DP, sulfonated 349464-98-8DP, Poly[(4-phenoxybenzoyl)-1,3-phenylene], sulfonated

RL: IMF (Industrial manufacture); PRP (Properties); TEM

(Technical or engineered material use); PREP (Preparation); USES

(Uses)

(polymers bearing sulfonic acid groups for forming proton-conductive films)

IT 349452-14-8P

RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)

(polymers bearing sulfonic acid groups for forming proton-conductive films)

IT **349452-16-ODP**, sulfonated

RL: IMF (Industrial manufacture); PRP (Properties); TEM

(Technical or engineered material use); PREP (Preparation); USES

(Uses)

(polymers bearing sulfonic acid groups for forming proton-conductive films)

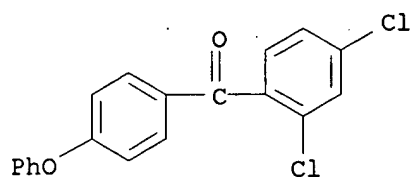
RN 349452-16-0 HCAPLUS

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,4-dichlorophenyl)(4-phenoxyphenyl)methanone (9CI) (CA INDEX NAME)

CM 1

CRN 349452-14-8

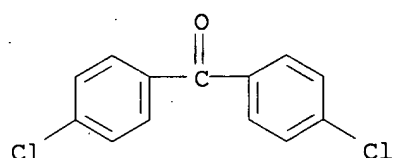
CMF C19 H12 Cl2 O2



CM 2

CRN 90-98-2

CMF C13 H8 Cl2 O



L16 ANSWER 25 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:488751 HCAPLUS

DN 135:79461

TI Method of preparation of polymer **electrolyte** for **fuel cell**

IN Terahara, Atsushi; Iwasaki, Katsuhiko; Ikeda, Takashi

PA Sumitomo Chemical Company, Limited, Japan

SO Eur. Pat. Appl., 13 pp.

CODEN: EPXXDW

DT Patent

LA English

IC ICM H01M008-10

ICS H01B001-12; C08F008-36

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38

FAN.CNT 1

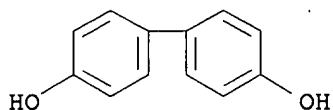
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	JP 2001250567	A2	20010914	JP 2000-61768	20000307
	US 2001041279	A1	20011115	US 2000-742115	20001222
PRAI	JP 1999-370689	A	19991227		
	JP 2000-61768	A	20000307		

AB Provided is a polymer **electrolyte** contg. a block copolymer comprising one or more blocks having sulfonic acid groups and one or more blocks having substantially no sulfonic acid group, and at least one block among all blocks is a block having arom. rings in the main chain thereof, and a method for producing the same. The polymer **electrolyte** is suitable for a proton conductive film of a **fuel cell** due to excellent water resistance and heat resistance, and high proton cond.

ST **fuel cell block polymer electrolyte**  
 IT **Fuel cell electrolytes**  
 (method of prepn. of polymer **electrolyte**)  
 IT Ionic conductivity  
 (proton; method of prepn. of polymer **electrolyte**)  
 IT **347384-10-5DP, sulfonated 347384-11-6DP, sulfonated**  
**347384-12-7DP, sulfonated 347384-13-8DP, sulfonated**  
**347384-14-9DP, sulfonated**  
 RL: DEV (Device component use); PRP (Properties); **SPN (Synthetic**  
**preparation); PREP (Preparation); USES (Uses)**  
 (method of prepn. of polymer **electrolyte**)  
 IT 25667-42-9, Sumika ExcelpES5003P  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (method of prepn. of polymer **electrolyte**)  
 IT **347384-10-5DP, sulfonated 347384-11-6DP, sulfonated**  
**347384-12-7DP, sulfonated 347384-13-8DP, sulfonated**  
**347384-14-9DP, sulfonated**  
 RL: DEV (Device component use); PRP (Properties); **SPN (Synthetic**  
**preparation); PREP (Preparation); USES (Uses)**  
 (method of prepn. of polymer **electrolyte**)  
 RN 347384-10-5 HCAPLUS  
 CN [1,1'-Biphenyl]-4,4'-diol, polymer with [1,1'-biphenyl]-2-ol and  
 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA  
 INDEX NAME).

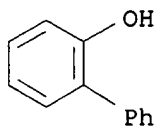
CM 1

CRN 92-88-6  
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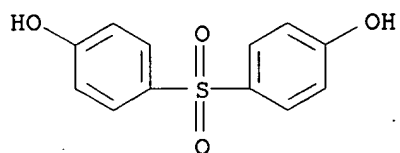
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CRN 90-43-7  
 CMF C12 H10 O



CM 3

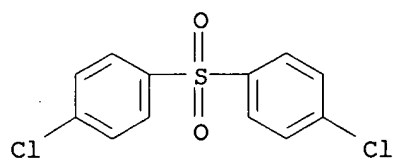
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 CMF C12 H10 O4 S



CM 4

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



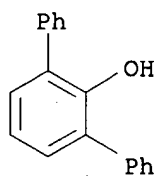
RN 347384-11-6 HCAPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene],  
[1,1':3',1''-terphenyl]-2'-ol and 4,4'-sulfonylbis[phenol] (9CI) (CA  
INDEX NAME)

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CRN 2432-11-3

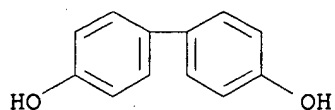
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CM 2

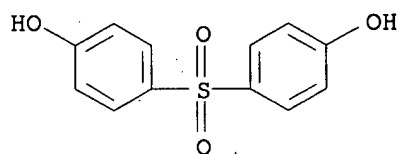
CRN 92-88-6

CMF C12 H10 O2



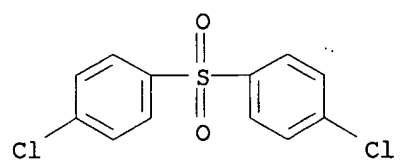
CM 3

CRN 80-09-1  
CMF C12 H10 O4 S



CM 4

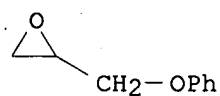
CRN 80-07-9  
CMF C12 H8 Cl2 O2 S



RN 347384-12-7 HCAPLUS  
CN Phenol, 4,4'-sulfonylbis-, polymer with (chloromethyl)oxirane, (phenoxymethyl)oxirane and 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

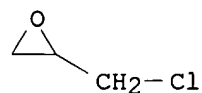
CM 1

CRN 122-60-1  
CMF C9 H10 O2



CM 2

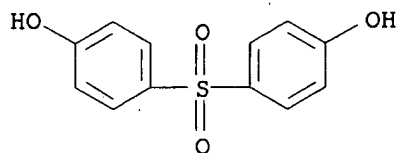
CRN 106-89-8  
CMF C3 H5 Cl O



CM 3

CRN 80-09-1

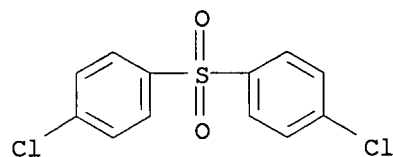
CMF C12 H10 O4 S



CM 4

CRN 80-07-9

CMF C12 H8 C12 O2 S



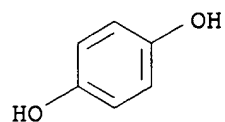
RN 347384-13-8 HCAPLUS

CN 1,4-Benzenediol, polymer with (chloromethyl)oxirane, 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 123-31-9

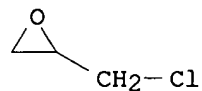
CMF C6 H6 O2



CM 2

CRN 106-89-8

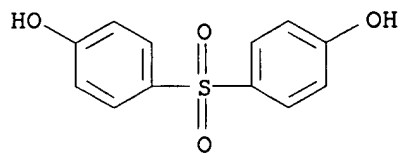
CMF C3 H5 Cl O



CM 3

CRN 80-09-1

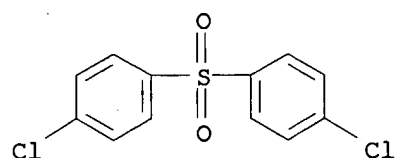
CMF C12 H10 O4 S



CM 4

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



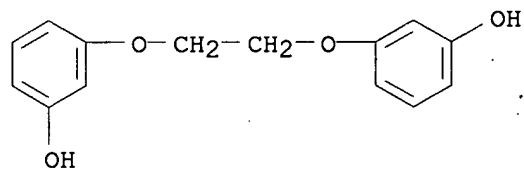
RN 347384-14-9 HCAPLUS

CN Phenol, 3,3'-[1,2-ethanediylbis(oxy)]bis-, polymer with (chloromethyl)oxirane, 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 61166-00-5

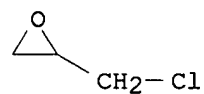
CMF C14 H14 O4



CM 2

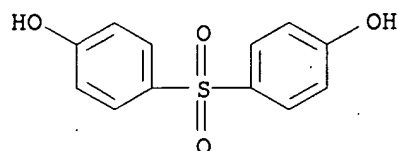
CRN 106-89-8

CMF C3 H5 Cl O



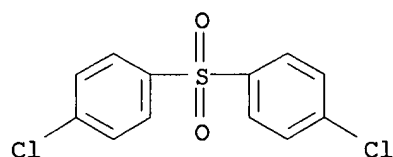
CM 3

CRN 80-09-1  
CMF C12 H10 O4 S



CM 4

CRN 80-07-9  
CMF C12 H8 C12 O2 S



L16 ANSWER 26 OF 30 HCAPLUS COPYRIGHT 2003 ACS  
AN 2001:421255 HCAPLUS  
DN 135:35193  
TI Solid polymer **electrolyte fuel cells** and  
their operation  
IN Terada, Ichiro  
PA Asahi Glass Co., Ltd., Japan  
SO Jpn. Kokai Tokkyo Koho, 6 pp.  
CODEN: JKXXAF  
DT Patent  
LA Japanese  
IC ICM H01M008-10  
ICS H01M008-02; H01M008-04  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001160408	A2	20010612	JP 1999-342321	19991201
PRAI	JP 1999-342321		19991201		

AB The fuel gas and/or the oxidn. gas is fed to the electrodes after their contact with ion exchangers. Operation of the cells including the above stated process is also claimed.

ST solid polymer **electrolyte fuel cell**  
operation; gas ion exchange treatment **fuel cell**; oxidn  
gas ion exchange treatment **fuel cell**; polysulfone  
polythioether ion exchanger **fuel cell**

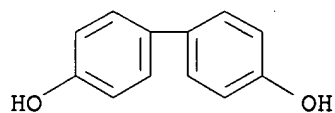
IT Polyolefin fibers  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(ethylene, ion exchanger support; operation of solid polymer

- electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- IT Polyolefin fibers  
Synthetic polymeric fibers, uses  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PREP (Preparation); PROC (Process); USES (Uses)  
(ethylene-styrene, graft, chlorosulfonated, chloromethylated, and , quaternized, anion exchange filter; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- IT Alkenes, uses  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(fluoro, ion exchanger layer formed on; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- IT Polyolefins  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(ion exchanger layer formed on; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- IT Anion exchangers  
Cation exchangers  
Ion exchange  
Solid state **fuel cells**  
(operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- IT Polythioethers  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PREP (Preparation); PROC (Process); USES (Uses)  
(polysulfone-, chloromethylated and aminated, anion exchange filters; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- IT Polysulfones, uses  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PREP (Preparation); PROC (Process); USES (Uses)  
(polythioether-, chloromethylated and aminated, anion exchange filters; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- IT 75-50-3DP, Trimethylamine, reaction products with chloromethylated polymers **25608-64-4DP**, chloromethylated, reaction products with trimethylamine  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); **PREP (Preparation)**; PROC (Process); USES (Uses)  
(anion exchange filter; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas

- through ion exchangers before their feeding to electrodes)
- IT 26654-97-7P  
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PREP (Preparation); PROC (Process); USES (Uses)  
 (cation exchange filter; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- IT 106826-12-4DP, Ethylene-styrene graft copolymer, chlorosulfonated, chloromethylated, reaction products with trimethylamine, quaternized  
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); PREP (Preparation); PROC (Process); USES (Uses)  
 (fiber, anion exchange filter; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- IT 9002-88-4, Polyethylene  
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (ion exchanger support; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- IT 25608-64-4DP, chloromethylated, reaction products with trimethylamine  
 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PNU (Preparation, unclassified); **PREP (Preparation)**; PROC (Process); USES (Uses)  
 (anion exchange filter; operation of solid polymer **electrolyte fuel cells** by treatment of fuel gas and/or oxidn. gas through ion exchangers before their feeding to electrodes)
- RN 25608-64-4 HCAPLUS  
 CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

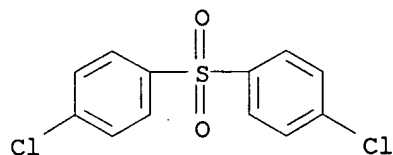
CM 1

CRN 92-88-6  
 CMF C12 H10 O2



CM 2

CRN 80-07-9  
 CMF C12 H8 C12 O2 S



L16 ANSWER 27 OF 30 HCAPLUS COPYRIGHT 2003 ACS  
 AN 2001:212602 HCAPLUS  
 DN 134:367313  
 TI Copolymerization of arylchlorides by nickel catalyzed coupling: novel polyelectrolytes  
 AU Poppe, D.; Frey, H.; Heinzl, A.; Mulhaupt, R.  
 CS Institut für Makromolekulare Chemie and Freiburger Materialforschungszentrum (FMF), Freiburg, D-79104, Germany  
 SO Polymeric Materials Science and Engineering (2001), 84, 333-334  
 CODEN: PMSEGD; ISSN: 0743-0515  
 PB American Chemical Society  
 DT Journal  
 LA English  
 CC 35-5 (Chemistry of Synthetic High Polymers)  
 AB The objective of this work was the synthesis of poly(arylenesulfone) copolymers with carboxylic acid functionalities. Copolymn. of Me 2,5-dichlorobenzoate (MDCB) and 4,4'-dichlorodiphenylsulfone (DCDS) by nickel-catalyzed coupling reaction was studied. Polymers with different DCDS/MCDB incorporation ratios were obtained. The materials were sol. in chloroform. Mol. wts. detd. by SEC varied between  $M_w = 7,000$  g/mol and 36,500 g/mol. Casting of the copolymer with the highest mol. wt. from chloroform afforded flexible and transparent films. Hydrolysis of the polymers led to a flexible polyelectrolyte which was sol. in water in the form of its deprotonated species. The water insol. protonated polymer was swollen without losing its mech. integrity. TGA showed good thermal stability. In future work we will study the suitability of these carboxylic acid functionalized poly(arylenesulfone)s as blend component for **fuel cell membranes**.  
 ST thermally stable polyelectrolyte dichlorobenzoate dichlorodiphenylsulfone copolymer prepn; polyarylene sulfone prepn thermally stable polyelectrolyte  
 IT Polyelectrolytes  
 (anionic; copolymn. of arylchlorides by nickel catalyzed coupling giving thermally stable polyelectrolytes)  
 IT Polysulfones, preparation  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
 (arom.; copolymn. of arylchlorides by nickel catalyzed coupling giving thermally stable polyelectrolytes)  
 IT Thermal stability  
 (copolymn. of arylchlorides by nickel catalyzed coupling giving thermally stable polyelectrolytes)  
 IT **340127-60-8DP**, Methyl 2,5-dichlorobenzoate-4,4'-dichlorodiphenyl sulfone copolymer, hydrolyzed  
 RL: PRP (Properties); **SPN (Synthetic preparation); PREP (Preparation)**  
 (copolymn. of arylchlorides by nickel catalyzed coupling giving thermally stable polyelectrolytes)  
 RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Chaturvedi, V; Macromolecules 1993, V26, P2607 HCAPLUS
- (2) Colon, I; J Org Chem 1986, V51, P2627 HCAPLUS
- (3) Colon, I; J Polym Sci, Part A: Polym Chem 1990, V28, P367 HCAPLUS
- (4) Ghassemi, H; Polymer 1997, V38, P3139 HCAPLUS
- (5) Grob, M; Macromolecules 1996, V29, P7284 HCAPLUS
- (6) Havelka-Rivard, P; Macromolecules 1999, V32, P6418 HCAPLUS
- (7) Kaeriyama, K; Synth Met 1995, V69, P507 HCAPLUS
- (8) Kwiatkowski, G; J Macromol Sci, Pure Appl Chem 1997, VA34, P1945 HCAPLUS
- (9) Percec, V; Macromolecules 1992, V25, P1816 HCAPLUS
- (10) Percec, V; Macromolecules 1999, V32, P2597 HCAPLUS
- (11) Phillips, R; Macromolecules 1994, V27, P2354 HCAPLUS
- (12) Ueda, M; Macromol Rapid Commun 1995, V16, P469 HCAPLUS
- (13) Ueda, M; Macromolecules 1990, V23, P926 HCAPLUS

IT 340127-60-8DP, Methyl 2,5-dichlorobenzoate-4,4'-dichlorodiphenyl sulfone copolymer, hydrolyzed

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)

(copolymn. of arylchlorides by nickel catalyzed coupling giving thermally stable polyelectrolytes)

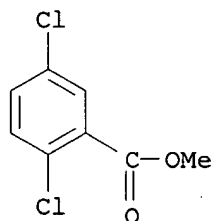
RN 340127-60-8 HCAPLUS

CN Benzoic acid, 2,5-dichloro-, methyl ester, polymer with 1,1'-sulfonylbis[4-chlorobenzene] (9CI) (CA INDEX NAME)

CM 1

CRN 2905-69-3

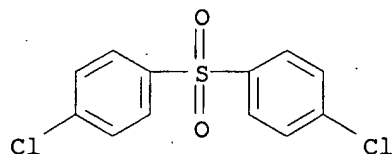
CMF C8 H6 Cl2 O2



CM 2

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



L16 ANSWER 28 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2000:594001 HCAPLUS

DN 133:296766  
 TI Synthesis and characterization of controlled molecular weight sulfonated amino-functional poly(arylene ether sulfone)s prepared by direct polymerization  
 AU Mecham, J.; Shobha, H. K.; Wang, F.; Harrison, W.; McGrath, J. E.  
 CS Department of Chemistry and Center for High Performance Polymeric Adhesives and Composites (0344), Virginia Polytechnic Institute and State University, Blacksburg, VA, 24061, USA  
 SO Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2000), 41(2), 1388-1389  
 CODEN: ACPPAY; ISSN: 0032-3934  
 PB American Chemical Society, Division of Polymer Chemistry  
 DT Journal  
 LA English  
 CC 35-5 (Chemistry of Synthetic High Polymers)  
 AB Controlled mol. wt. sulfonated poly(arylene ether sulfone)s were prep'd. by direct polymn. of the sulfonated dihalide using typical polysulfone polymn. conditions. Reaction temps. of 190.degree. were needed to ensure the polymer remained in soln. throughout the reaction. The 4,4'-dichlorodiphenylsulfone (DCDPS) with fuming sulfuric acid (SO3 28%), isolated with NaCl, neutralized with NaOH, and finally isolated with NaCl. The electrophilic arom. substitution reaction sulfonates DCDPS meta to the sulfonyl group and ortho to the chlorine group. Polymn. involved condensation of m-aminophenol with SDCDPS and biphenol in NMP, with toluene as an azeotroping agent. These materials can be used as macromonomers in poly(imide) segmented copolymer reactions and as proton exchange **membranes for fuel cells**.  
 ST dichlorodiphenylsulfone sulfonation fuming sulfuric acid direct polymn; polyaryleneether polysulfone prepn controlled mol wt  
 IT Polysulfones, preparation  
 Polysulfones, preparation  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (polyoxyarylene-, arom., sulfonated; prepn. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)  
 IT Polyoxyarylenes  
 Polyoxyarylenes  
 RL: SPN (Synthetic preparation); PREP (Preparation)  
 (polysulfone-, arom., sulfonated; prepn. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)  
 IT Polymerization  
 Sulfonation  
 (prepn. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)  
 IT 51698-33-0P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (monomer; prepn. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)  
 IT 80-07-9, 4,4'-Dichlorodiphenylsulfone 7446-11-9, Sulfur trioxide, reactions  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (prepn. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)  
 IT 591-27-5DP, m-Aminophenol, reaction products with sulfo group-contg. polyether-polysulfones **267877-35-0DP**, m-aminophenol end-capped

RL: **SPN (Synthetic preparation); PREP (Preparation)**

(prepn. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE

- (1) Applby, A; Sci American 1999, P72
- (2) Dumais, J; Macromolecules 1986, V19, P1884 HCAPLUS
- (3) Jacoby, M; C&E News 1999, V31, P71
- (4) McGrath, J; J of Polym Sci 1984, V22, P721
- (5) McGrath, J; Poly(aryl ether) Membranes for Reverse Osmosis 1981, V153, P327
- (6) McGrath, J; Polymer Preprints 2000, V41(1)
- (7) Noshay, A; J of Appl Poly Sci 1976, V20, P1885 HCAPLUS
- (8) Robeson, L; Dynamic Mechanical Characteristics of Polysulfones and Other Polyarylethers, in Molecular Basis for Transitions and Relaxations 1978, V4, P405 HCAPLUS
- (9) Ueda, M; J Polym Sci, Poly Chem Ed 1993, V31, P85

IT **267877-35-ODP**, m-aminophenol end-capped

RL: **SPN (Synthetic preparation); PREP (Preparation)**

(prepn. of sulfonated dichlorodiphenylsulfone and of controlled mol. wt. amino-terminated sulfonated poly(arylene ether sulfone)s)

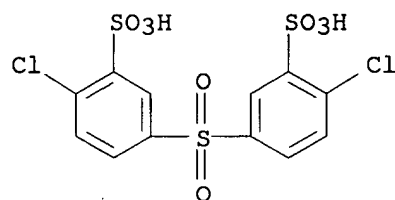
RN 267877-35-0 HCAPLUS

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, disodium salt, polymer with [1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-chlorobenzene] (9CI)  
(CA INDEX NAME)

CM 1

CRN 51698-33-0

CMF C12 H8 Cl2 O8 S3 . 2 Na

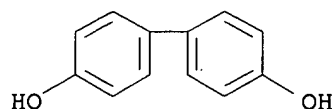


● 2 Na

CM 2

CRN 92-88-6

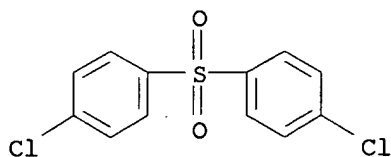
CMF C12 H10 O2



CM 3

CRN 80-07-9

CMF C12 H8 C12 O2 S



L16 ANSWER 29 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 2000:191136 HCAPLUS

DN 132:237553

TI Polyoxyphenylene ion-exchange polymers

IN Charnock, Peter; Kemmish, David John; Staniland, Philip Anthony; Wilson, Brian

PA Victrex Manufacturing Ltd., UK

SO PCT Int. Appl., 64 pp.

CODEN: PIXXD2

DT Patent

LA English

IC ICM C08G065-48

ICS C08J005-22; H01M006-18; H01M010-40; H01M008-10; H01M002-16

CC 35-5 (Chemistry of Synthetic High Polymers)

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2000015691	A1	20000323	WO 1999-GB2833	19990910
	W:	AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			
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	AU 9957509	A1	20000403	AU 1999-57509	19990910
	EP 1112301	A1	20010704	EP 1999-944684	19990910
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	JP 2002524631	T2	20020806	JP 2000-570225	19990910
	WO 2001019896	A1	20010322	WO 2000-GB3449	20000908
	W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			

EP 1228122            A1    20020807            EP 2000-958834    20000908  
           R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
           IE, SI, LT, LV; FI, RO, MK, CY, AL  
 JP 2003509554            T2    20030311            JP 2001-523671    20000908  
 PRAI GB 1998-19706            A    19980911  
       GB 1998-20940            A    19980928  
       GB 1999-13572            A    19990611  
       WO 1999-GB2833            W    19990910  
       GB 2000-6884            A    20000322  
       WO 2000-GB3449            W    20000908  
 AB    Ion-Exchange polymers for a polymer **electrolyte membrane**  
       include the repeating units EAr(C6H4)mE' (I),  
       C6H4CO(C6H4)WG[(C6H4)rCOC6H4]s (II), and/or C6H4SO2(C6H4)zG[(C6H4)tSO2C6H4  
       ]v (III) wherein at least some of the units I, II and/or III are  
       sulfonated; wherein the Ph moieties in units I, II, and III are  
       independently optionally substituted and optionally cross-linked; and  
       wherein m, r, s, t, v, w and z independently represent zero or a pos.  
       integer, E and E' independently represent an oxygen or a sulfur atom or a  
       direct link, G represents an oxygen or sulfur atom, a direct link or a  
       -O-Ph-O- moiety where Ph represents a Ph group and Ar is selected from one  
       of the above moieties (i) to (x) which is bonded via one or more of its Ph  
       moieties to adjacent moieties.  
 ST    sulfonated polyoxyphenylene ion exchange **electrolyte**  
       **membrane**  
 IT    **Membranes**, nonbiological  
       (**electrolyte**; polyoxyphenylene ion-exchange polymers)  
 IT    Electrodes  
       (gas-diffusion; polyoxyphenylene ion-exchange polymers)  
 IT    **Electrolytes**  
       (**membrane**; polyoxyphenylene ion-exchange polymers)  
 IT    Polyoxyphenylenes  
       Polyoxyphenylenes  
       Polyoxyphenylenes  
       RL: IMF (Industrial manufacture); TEM (Technical or engineered material  
       use); PREP (Preparation); USES (Uses)  
       (polyketone-, cardo; polyoxyphenylene ion-exchange polymers)  
 IT    Polyoxyphenylenes  
       Polyoxyphenylenes  
       RL: IMF (Industrial manufacture); TEM (Technical or engineered material  
       use); PREP (Preparation); USES (Uses)  
       (polyketone-; polyoxyphenylene ion-exchange polymers)  
 IT    Polysulfones, preparation  
       Polysulfones, preparation  
       Polysulfones, preparation  
       RL: IMF (Industrial manufacture); TEM (Technical or engineered material  
       use); PREP (Preparation); USES (Uses)  
       (polyketone-polyoxyphenylene-; polyoxyphenylene ion-exchange polymers)  
 IT    Cardo polymers  
       RL: IMF (Industrial manufacture); TEM (Technical or engineered material  
       use); PREP (Preparation); USES (Uses)  
       (polyketone-polyoxyphenylenes; polyoxyphenylene ion-exchange polymers)  
 IT    Polyoxyphenylenes  
       Polyoxyphenylenes  
       Polyoxyphenylenes  
       RL: IMF (Industrial manufacture); TEM (Technical or engineered material  
       use); PREP (Preparation); USES (Uses)  
       (polyketone-polysulfone-; polyoxyphenylene ion-exchange polymers)  
 IT    **Fuel cells**

(polyoxyphenylene ion-exchange polymers)

IT Polyketones  
Polyketones  
Polyketones  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyoxyphenylene-, cardo; polyoxyphenylene ion-exchange polymers)

IT Polyketones  
Polyketones  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyoxyphenylene-, polyoxyphenylene ion-exchange polymers)

IT Polyketones  
Polyketones  
Polyketones  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(polyoxyphenylene-polysulfone-, polyoxyphenylene ion-exchange polymers)

IT 25718-32-5DP, sulfonated **83094-08-ODP**, sulfonated  
88033-16-3DP, sulfonated 104570-14-1DP, sulfonated 105777-36-4DP,  
sulfonated 116875-10-6P 125430-17-3DP, sulfonated 125431-57-4DP,  
sulfonated 128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-  
dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer, sulfonated  
128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-  
dihydroxydiphenylsulfone copolymer, sulfonated 139357-70-3DP, sulfonated  
261638-66-8P 261638-67-9DP, sulfonated  
RL: **IMF (Industrial manufacture)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
(polyoxyphenylene ion-exchange polymers)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Commissariat Energie Atomique; FR 2748485 A 1997 HCAPLUS  
(2) Hoechst Ag; EP 0574791 A 1993 HCAPLUS  
(3) Ici Plc; EP 0008895 A 1980 HCAPLUS  
(4) Ici Plc; EP 0382440 A 1990 HCAPLUS  
(5) Joachim, C; WO 9629360 A 1996 HCAPLUS  
(6) Sumitomo Chemical Co; EP 0932213 A 1999 HCAPLUS  
(7) Union Carbide Corp; EP 0211693 A 1987 HCAPLUS

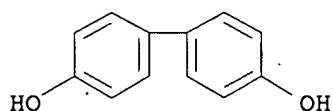
IT **83094-08-ODP**, sulfonated  
RL: **IMF (Industrial manufacture)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)  
(polyoxyphenylene ion-exchange polymers)

RN 83094-08-0 HCAPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

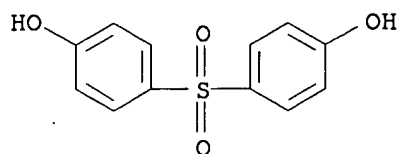
CRN 92-88-6  
CMF C12 H10 O2



CM 2

CRN 80-09-1

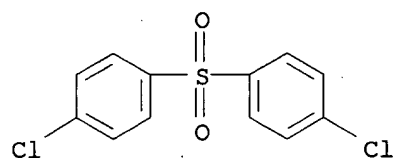
CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 Cl2 O2 S



L16 ANSWER 30 OF 30 HCAPLUS COPYRIGHT 2003 ACS

AN 1998:70920 HCAPLUS

DN 128:143140

TI Polymer **electrolytes** for **fuel cells** and the **fuel cells**

IN Iwasaki, Katsuhiko; Yamamoto, Taketsugu; Harada, Hiroshi; Terahara, Atsushi; Sato, Kuniyisa

PA Sumitomo Chemical Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-02

ICS C08G075-20; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 10021943	A2	19980123	JP 1996-169932	19960628
	US 5985477	A	19991116	US 1997-997564	19971223
PRAI	JP 1996-169932		19960628		
GI					

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB The **electrolytes** are sulfonated copolymers of I and II (Ar = III, IV, V, VI, VII, VIII, or IX, m = 1-3, n = 1 or 2) having ion exchanging group equiv. wt. 500-2500 g/mol. The **electrolytes** are preferably in the form of a **membrane** prepd. by soln. casting, melt pressing, or extrusion molding.

ST **fuel cell** arom sulfone sulfonate **electrolyte**

IT **Fuel cell electrolytes**  
(comps. and manuf. of ion exchanger polymer **electrolytes** for **fuel cells**)

IT **83094-08-ODP**, sulfonated  
RL: DEV (Device component use); **IMF (Industrial manufacture)**;  
PRP (Properties); **PREP (Preparation)**; USES (Uses)  
(comps. and manuf. of ion exchanger polymer **electrolytes** for **fuel cells**)

IT **83094-08-ODP**, sulfonated  
RL: DEV (Device component use); **IMF (Industrial manufacture)**;  
PRP (Properties); **PREP (Preparation)**; USES (Uses)  
(comps. and manuf. of ion exchanger polymer **electrolytes** for **fuel cells**)

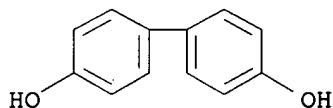
RN 83094-08-0 HCAPLUS

CN [1,1'-Biphenyl]-4,4'-diol, polymer with 1,1'-sulfonylbis[4-chlorobenzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

CM 1

CRN 92-88-6

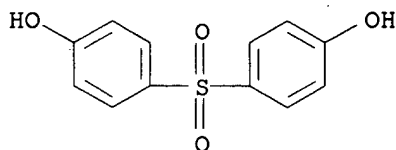
CMF C12 H10 O2



CM 2

CRN 80-09-1

CMF C12 H10 O4 S



CM 3

CRN 80-07-9

CMF C12 H8 C12 O2 S

